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A STUDY OF THE ENDOCRINE ORGANS IN THE PSYCHOSES.

BY BERTRAM D. LEWIN, M. D.
Assistant in Neuropathology, New York State Psychiatric Institute, Ward's Island, N. Y.

A growing interest in a possible connection between endocrine organs and psychoses has been responsible for several important studies, either on material from various psychotic groups, or from the dementia præcox group alone. In regard to this latter group, there are two prevalent opinions. Mott [1, 2, 3, 4, 5, 6, 7] in London, and Lewis [8] in Washington have formulated theories which assume an intimate connection between anatomic findings in the endocrine organs and the psychosis, while Morse,[9] Borberg,[10] Fauser and Heddaeus [11] recognize no findings characteristic of, or specific for, the psychosis.

At the Psychiatric Institute, where dementia præcox has been for some time the subject of anatomic investigation, it was hoped that material could be collected, the study of which might throw some light on this question. Before undertaking any restricted study on selected dementia præcox material, it was thought desirable in the first place to survey the general field of the endocrine organs in unselected psychotic material.

For this purpose we asked for and received from the pathologists of the New York State hospitals the endocrine organs of all cases coming to necropsy examination within six hours after death. The organs sent were the hypophysis, the thyroid gland, the adrenal glands, and the sex glands; in addition, a sample of the intestine and several lymph nodes. With the material, the pathologists sent only the name and identification number of the patient, the necropsy and clinical reports being sent later, after the material had been studied and the findings recorded. It was

hoped that this approach might enable us to arrive at a pathological anatomical classification of the organs that would be purely objective, uninfluenced by the clinicians' opinions; and that, after this, it might be possible to establish correlations between the pathological anatomical findings on the one hand, and the clinical, functional, and diagnostic findings on the other.

The fixative used was 10 per cent liquor formaldehydi. One or more paraffin blocks were prepared from each specimen, the sections (10 micra) being stained with hæmatoxyline and eosine, and by Van Gieson's method. In some cases, Jahnel's silver stain for spirochætes, or the Scarlet R. fat stain on frozen sections were employed as well.

PART I. ANATOMICAL FINDINGS.

The Testes.

Histologically considered, the testis consists of the seminiferous tubules with their wall, sometimes called "the basement membrane"; the germinal cells within the tubules and the extra-tubular or, as it is also called, the interstitial tissue. The extra-tubular tissue consists of connective tissue fibers and cells, blood-vessels, and interstitial gland cells. The pathology of the testis is the sum of the changes which occur within the tubules, in the tubule wall, and in the tissue between the tubules.

Tubules and extra-tubular tissue differ in testes of different ages. In youth we find small tubules with smooth thin walls, and thin, moderately cellular extra-tubular connective tissue separating them slightly from one another; numerous germinal cells and mitotic figures; and interstitial gland cells containing a finely granular lipoid pigment. In somewhat older cases, the tubules are larger, and the extra-tubular tissue denser, the tubules being either in contact with each other, or cemented together by a narrow band of relatively fibrous connective tissue; and the interstitial gland cells more deeply pigmented. In old age there are small tubules with shrunken, wrinkled, thickened walls, a diminished number of germinal cells and mitotic figures; thin pale-staining extra-tubular connective tissue; thickened, frequently anuclear and degenerating vessels, and variably, a reduction in the number of interstitial cells, which are deeply pigmented with coarse lipoid granules. In old age, also, in nearly all cases, there are areas variable in extent where

the tubule has lost all its germinal epithelium, connective tissue from the basement membrane filling in and obliterating the lumen. The tubule then appears as a connective tissue shadow of its former self. For brevity this condition is referred to in this paper as intra-tubular fibrosis.

Our 65 cases, when grouped according to their anatomic appearance, were 24 of the senile type, 24 of the mature type, and 13 of the young type. The age at death as determined later from the report of the pathologists, correlated approximately with this grouping. Four cases of the 65 were exceptional, being examples of undescended or undeveloped testes, and these may now be discussed.

Undeveloped Testes (4 cases).—Two of the cases, one of senile psychosis, age 102 at death, and one of dementia præcox, aged 72, besides showing a lack of development, presented the intra-tubular and connective tissue changes characteristic of the senile group. They were consequently included in both the senile and the undeveloped groups. The other two cases were a man of 40 with signs and symptoms of pituitary tumor, and a boy of 13 with amaurotic idiocy, juvenile type.

These four pairs of undeveloped testes were all small, but in certain respects they showed considerable variation. Thus, in the testes from the man of 102 years, there was no trace of interstitial cells; in those from the man of 72, there were only a few of them heavily laden with pigment distributed in islands; while in the testes of the 40-year-old man the interstitial gland cells were numerous and healthy. Yet clinically, all three cases had scanty hair, of feminine distribution, or absence of body hair, and infantile genitalia. In the testis of the boy of 13, the tiny tubules were lined by a single layer of almost entirely undifferentiated germinal cells, interstitial gland cells being scanty. Clinically, the amaurotic idiot and the pituitary tumor cases were definitely feeble-minded, and this condition was apparently not excluded in the other two cases. For a summarized comparison of the functional and anatomical findings, of the three adult cases, see Table VI, page 417. (See Figs, 5, 6, 7, 8.)

Fibrosis.—Besides changes due to age or to lack of development, we found in many cases changes that were pathological in the narrow sense of this term. The most striking was fibrosis. We

encountered two types of fibrosis. One type was a fibrous or fibrocellular thickening of the tissue between the tubules, and this type will be referred to as *extra-tubular* fibrosis. (See Figs. 2, 3.) The other type, referred to in this paper as *intra-tubular* fibrosis was a fibrous, usually acellular, change within the tubules themselves. (See Fig. 4.)

Thirty-three of the 65 cases showed the extra-tubular type of fibrosis. In 25 of the 33 there was a lymphocytic exudate, with occasional plasma cells. It is noteworthy that 16 of the 33 revealed at necropsy examination a tuberculosis of the lungs, intestines, or meninges. Three others of the 33 were luetic; one other dying of cancer had a history of gonorrhea; another, multiple abscesses in the testes. As a likely cause of extra-tubular fibrosis, then, we cannot overlook these specific infections. The remaining 12 of the 33 cases were:

1230, senile, lung abscesses.
1192, arteriosclerotic, cardio-renal disease.
1226, dementia præcox, general arteriosclerotic nephritis, acute pericarditis, bronchitis.
1129, dementia præcox, acute myocarditis.
1197, dementia præcox, cardio-renal disease.
1259, paranoic condition, lobar pneumonia.
1187, paranoic condition, cardio-renal disease, chronic bronchitis.
1144, delirium, carcinoma of the pharynx.
1228, endothelioma of the meninges.
1233, endothelioma of the meninges.
1243, traumatic psychosis, purulent bronchitis.
1182, Huntington's chorea, cirrhosis of the liver.

The other type of fibrosis, the *intra-tubular,* was found either combined with the extra-tubular fibrosis or alone. It was in the senile testes that the *intra-tubular* fibrosis was found unassociated with the extra-tubular type. Indeed, intra-tubular fibrosis seemed to be a constant concomitant of old age, the end stage of senile atrophy of the tubule. Whenever intra-tubular fibrosis was found in younger testes, it accompanied, without exception, an extra-tubular fibrosis, which was usually of obvious inflammatory origin. Apparently, in certain cases the proliferated extra-tubular fibrous tissue brought about the intra-tubular changes by constricting the wall of the tubule and interfering with its nutrition. This at least seemed to be the case in certain testes with patchy extra-tubular

fibrosis: a tubule at one spot would be seen surrounded and constricted by a patch of fibrous tissue; beyond the fibrous patch it would show intra-tubular fibrosis. However, in most cases, the simultaneous influence of toxic agents on germinal and extra-tubular tissue with resulting changes both within and without the tubule is not to be excluded.

In our material 32 of the 65 cases showed intra-tubular fibrosis, and in 19 of the 32 both types coexisted.

Spermatogenesis.—A most important problem is to define what constitutes the histological picture of reduced spermatogenesis. On the one hand we constantly encounter testes in which there are no spermatozoa to be seen in the tubules, though they are to be seen in the epididymis and in the vas. Contrariwise, in other testes, the duct system may be devoid of spermatozoa while the lumina of the testicular tubules are loaded with them. In either case we are sure that spermatogenesis has not ceased. When no spermatozoa are found either in the tubules or the epididymis, shall we assume an arrest of spermatogenesis? The mere absence of mature spermatozoa does not seem a sufficient reason for such an assumption. A reduction of spermatogenesis can be deduced only from two findings: (1) A diminution in the number of germinal cells in the tubules, and (2) a diminution in the number of mitotic figures among them. In the presence of either or both of these findings, spermatogenesis can be considered on the wane, despite the presence of mature spermatozoa.

As to changes within the cells, such as lipoid deposits, swelling, and pycnosis of the nucleus, observed in certain cases, they are to be interpreted, in connection with other pathological processes in the testes, as signs of temporary or permanent cell damage. But such changes in the structure of the cell are intelligible only when the testes as a whole, and, in fact, the other organs as well are considered.

Spermatogenesis in our material will be considered below in the discussion of the various clinical groups.

Interstitial Gland Cells.—In our material the interstitial gland cells showed few changes. In general, it may be stated that in the older cases they were smaller than in the young cases, that they had darker, smaller nuclei, and that more of them were pigmented, with coarse yellowish lipoid granules. As regards their number,

it seemed that there was usually little difference from case to case. A diminution, where it was observed, characterized as a rule the older cases. The standard for judging the number was of course relative; we compared case with case.

One case in our collection (1134), dementia præcox, age 48, was remarkable for the large number of these cells. No special functional or clinical features were recorded in this case. A complete absence of interstitial gland cells was observed in both testes of a case 102 years old, referred to above, and in the right atrophic testis of case 1153, dementia præcox, age 53.

No particular significance attached to the manner of distribution of the cells. As usually seen, they were scattered singly or in small groups throughout the gland, but in some cases, they occurred definitely bunched into islands. This latter distribution was common in those testes in which there was a complete or nearly complete intra-tubular fibrosis with no extra-tubular fibrosis, and these were all senile cases. From our material it could not be ascertained whether there was any increase in the number of interstitial gland cells in cases of extra- or intra-tubular fibrosis.

The Ovaries.

The ovary is conventionally divided into cortex and medulla. In *young* ovaries this division is very arbitrary indeed, as both the central and the outer part of the gland are made up of a very cellular connective tissue stroma. In the outer part, however, in uncomplicated cases, are found the ova or primordial follicles, the developing follicles, the corpora lutea, and a few corpora fibrosa. In the medullary part of these young ovaries the vessels are cellular, thin-walled structures with active endothelium, only rarely showing fibrous changes. The corpora fibrosa found in the central region and the supporting connective tissue do not show degenerative changes. In *middle-age,* the stroma of cortex and medulla are still cellular, though less so than in youth, and only a few ova are to be seen, atretic follicles being the rule. The vessels, though in many cases thick, do not show degenerative changes, nor do the corpora fibrosa, which are found in greater number than in the young ovaries. In *old age,* the difference between the thin rim of cortex, with cellular or partly cellular stroma, and the fibrous medulla is sharp. The vessels of the medulla are thick and uni-

formly show degenerative changes. Derived chiefly from the adventitia, there is an abundance of fibrous connective tissue between the vessels, and this tissue also shows thinning and degenerative changes. In addition, some of the central fibrous tissue represents the shrunken atrophied remains of the corpora fibrosa. In these senile ovaries, of course, no active ova are to be found.

Our 43 cases were readily classified into three "anatomical" age groups; that is to say, on the basis of the histological picture they were young, middle-aged, or senile. They fell into these three groups in the following proportions:

Group I (young), 9 cases. Age at death 31 to 37 in 8 cases; 43 in one case (number 1140). This latter was considered a "border-line" case between the young and the middle-aged group. *Group II* (middle-aged), 14 cases. Age at death 42 to 55 in 12 cases; 37 and 39 in two cases (Nos. 1139 and 1216). In these two, a fibrous inflammatory complication confused the histological picture by producing vascular and connective tissue changes and interfering with the development of ova. *Group III* (senile), 20 cases. Age at death 60 to 89 in 19 cases; 53 in one case (No. 1180).

The ovaries of the last case referred to (1180), illustrated in Fig. 16, showed even more marked senile changes than those from a patient 89 years of age. The clinical history showed that the patient's menses had ceased when she was 32. The ovaries, then, 21 years after the menopause, seem to be truly though prematurely senile. Pellagra, responsible for her psychosis, was recognized clinically only five years before her death. Though it may have contributed towards producing the fibrosis that was present, it does not seem to furnish a completely adequate explanation of the premature menopause and the senile ovaries.

The Ova.—Only 11 of our 43 cases showed ova. In these, we attempted the study of (1) the appearance and structure of the individual ova, and (2) the number and state of development of the ova in each ovary. For the second feature, we could set no absolute standards. It was, however, possible to see how the ovaries in our series compared with each other in this regard—we could estimate to what degree a given ovary fell below the best ovum producing ovaries in the group.

Bearing in mind the statement of Mott,[1] that the ovum nuclei in dementia præcox are deficient in chromatin, an unsuccessful

attempt was made to separate into groups the ovaries with pale ovum nuclei and those with dark ovum nuclei. In all our cases, however, whatever the clinical diagnosis, paleness of the nucleus occurred in some part of the ovary, yet never in sufficient predominance to warrant a division of the ovaries on this basis into two groups.

In Table I, the findings in these 11 cases are summarized. The case in which ovum development is most active is placed at the head of the table, then the next most active, and so on in order of decreasing activity down to the least active.

The table shows that the two most active cases were a mental defective of 30, and a case of dementia præcox of 31. Relative to these two the other 9 cases showed a reduced ovum producing activity. The two cases at the bottom of the list, the least active cases, and the eighth case in the list (1140) owed their low position largely to their age (50, 42, 43). The other six cases, considering only their age (31 to 37), should have compared more favorably with the two best cases. However, in all six, there was a patchy fibrosis of the cortex, either with or without lymphoid exudates, and the ovum producing function suffered because of the complication. The source of the fibrosis differed from case to case.

Atrectic Follicles.—The failure of a follicle to reach its full development and rupture, a consequent degeneration of its lining cells and a metamorphosis of the usually acidophile fluid contents into a colorless granular debris; in other words, the so-called atresia of the follicle has been discussed by several authors who have studied the ovaries of the insane. Mott,[1, 2] has suggested that a lack of atretic follicles is a characteristic feature of the ovaries of dementia præcox. In our material, however, there would seem to be no correlation between clinical grouping and the presence or absence of this finding. Atretic follicles were found in practically every ovary where the patient was above the age of forty, while under this age they occurred regularly wherever there was a fibrosis, and sporadically in many other cases.

When a large atretic follicle is formed just below or at the surface of the ovary, that part of its wall which is at the surface frequently crumples, leaving a twisted fibrous loop projecting above the surface of the ovary. This condition was observed repeatedly in our material in cases with various clinical diagnoses:

TABLE I.

Case no. and age	Ovum	Ovary	Age of group	Other diseases	Diagnosis and duration	Remarks
No. 1287. Age 30.	50 primordial follicles per section on right, 28 on left; many mature and developing follicles. Corpus luteum in each ovary. Atretic follicle on left. Ovum nucleus usually somewhat dark—rich in chromatin; some pale.	Central cyst on left with connective tissue lining on left. No inflammatory changes.	Young.	Blindness since birth. Lobar pneumonia.	Psychosis with mental deficiency.	Very fat and short.
No. 1165. Age 31.	(Left ovary only) 35 primordial follicles per section. Numerous developing follicles in all stages. Mature follicle. One corpus luteum. Nucleus sometimes rich in chromatin, sometimes pale.	No inflammatory changes.	Young.	Acute pulmonary tuberculosis with pleurisy. Gastric ulcer.	Dementia præcox of 5 years duration.	2 children.
No. 1154. Age 37.	22 primordial follicles on left, 18 on right; mature and developing follicles. Corpus luteum and atretic follicles. Nuclei usually rich in chromatin.	Moderate fibrous inflammatory changes with adhesions to tube, fibrous scars in cortex and adhesions in lower pole. Vessel thickening beyond average.	Young.	Broncho-pneumonia. Chronic diffuse nephritis. Old laparotomy. Small aorta.	General paralysis of 2 years duration.	
No. 1242. Age 33.	10 primordial follicles on right; 30 on left, 3 atretic follicles. One of a nearly mature stage. Corpus luteum right. 2 large nearly mature follicles on right. Nuclei usually pale, sometimes dark.	Fibrosis in cortex especially on the right.	Young.	Exhaustion delirium. Thin right heart wall.	Psychosis with psychopathic personality.	1 miscarriage.
No. 1167. Age 31.	(Right only) 17 primordial follicles per section. No mature follicles or corpus luteum. Nuclei either pale or dark.	Multilocular cyst of follicular origin on right. Adhesions to other organs and omentum. Patchy fibrous areas. Left ovary lost in adhesions found at autopsy.	Young.	Pelvic adhesions. Death by hanging.	Manic-depressive. (Manic) 3d attack. Duration 3 years.	
No. 1207. Age 34.	14 primordial follicles on right. 2 atretic ones, 12 primordial follicles on left. Several follicles. No mature ones or corpus luteum. Nucleus usually found degenerated with chromatin clumping, pyknosis, or paleness.	Small ovaries with fibrous patches in cortex; adhesions, lymphoid cells. 2 follicular cysts.	Young.	Pulmonary tuberculosis.	Dementia præcox 9 years.	2 children.

TABLE I.—CONTINUED.

Case no. and age	Ovum	Ovary	Age of group	Other diseases	Diagnosis and duration	Remarks
No. 1153. Age 32.	10 primordial follicles on right. 12 on left. Mature follicles, few developing. Nucleus usually rich in chromatin.	Slight fibrosis. Follicular cysts on both sides.	Young.	Metrorrhagia for 49 days before onset psychosis. Thyroidectomy of right lobe 2 years before. Skin and intestinal pellagra.	Psychosis with pellagra. 3 weeks.	
No. 1140. Age 43.	6 primordial follicles on right; 7 on left. 2 mature follicles. Darkening and shrinkage of nucleus of ovum and follicular epithelium. Atretic follicles on right.	In general like the middle-aged group. was described as border-line case.	Young.	Acute enteritis. Acute cardiac dilatation.	Manic-depressive (depression) 4 weeks.	
No. 1137. Age 33.	1 primordial follicle on left. Several developing follicles. One mature on left. Nucleus darker than usual.	Fibrous patches in cortex. Vessel changes; follicular cysts. Adhesions marked.	Young.		General paralysis brain gumma. 5 months.	Male hair distribution. One child. Reduction in menses from 5-6 days to 2-3 days 1 year before death.
No. 1232. Age 42.	1 primordial follicle. No developing or mature follicles. Atretic follicles. Nucleus pale.	Patchy fibrosis. Thick vessels. Adhesions. Fibrous cyst on one side.	Middle-aged.	General paralysis.	General paralysis 3½ years duration.	Prostitute; no children.
No. 1136. Age 50.	1 primordial follicle. Atretic follicles. No developing or mature follicles. Nucleus dark.	Typical middle-aged ovary.	Middle-aged.	Chronic endocarditis. Pulmonary infarct.	Dementia præcox 33 years duration.	Not married.

epilepsy, manic-depressive insanity, senile psychosis, general paralysis, and dementia præcox. Poetzl and Wagner,[12] describing this condition in one case of dementia præcox, consider it a proliferation outward of the ovarian stroma, and part of a process specific to dementia præcox. Our findings seem to contradict this interpretation.

Inflammation and Fibrosis.—An old ovary is fibrous because ruptured follicles are replaced by fibrous scars. This type of fibrosis is easily recognized with the microscope and its follicular derivation is clear. Another sort of fibrosis (Fig. 15) seen in patches and streaks in the stroma of the cortex, accompanied by obliterative and degenerative vessel changes, and frequently by a lymphoid exudate, is derived from the stroma itself. This patchy fibrosis seems to indicate a pathological change in the ovary. In most older ovaries one cannot be sure that the changes due to age, especially the vascular and fibrous ones, might not mask such a patchy fibrosis. Among our 43 cases, however, there were 14 which clearly showed patchy fibrosis. Six of the 14 were paretics; one had cerebral syphilis. Of the 7 non-syphilitic cases there were: 4 of dementia præcox, death from active tuberculosis; one manic-depressive, with a marked chronic pelvic condition; one psychosis with psychopathic personality, death from exhaustion delirium of unknown origin; one pellagrin, death after three weeks delirium. A lymphoid exudate accompanied the fibrosis in one of the paretic cases, and in two of the dementia præcox cases.

In our material, therefore, there seemed to be a correlation between this type of fibrosis and the clinical groups of general paralysis and cerebral syphilis, the fibrosis being of a luetic or perhaps, to be more cautious, a venereal origin. In other groups, the fibrosis seemed to be secondary to tuberculosis, chronic pelvic disease, or toxic metabolic factors.

In four cases without patchy fibrosis lymphoid cells were found in 2 arteriosclerotic cases (1231, 1244) near large degenerating hilum vessels; in one case of melancholia (1156) surrounding a large hemorrhagic cyst; and in one epileptic case (1128) within a degenerating corpus fibrosum.

A fibrinous and polymorphonuclear exudate in the ovary was found in one case (1143, aged 48), delirium with acute general peritonitis of three weeks' duration. The patient had male hair

distribution, a finding which could not be correlated with the ovarian condition.

A fibrosis of another type and of a different origin than the patchy fibrosis was observed in two cases. In these, the corpora fibrosa in the central portion of the gland had persisted as large round fibrous bodies, without shrinkage or degeneration. In section, consequently, the gland showed a large central region filled with corpora fibrosa and a thin cellular cortex. The cases were 1128, epilepsy, aged 47, and 1131, paranoid dementia præcox, aged 52. Both cases at autopsy showed general arteriosclerosis. The epileptic had died of a cerebral hemorrhage. The significance of these large corpora fibrosa is not clear. However, their occurrence in only two of our cases, one of dementia præcox, and one of epilepsy, prevents our accepting the views advanced by Poetzl and Wagner,[13] who, on the basis of one case, regard such a condition as specifically characteristic of dementia præcox.

Follicular Cysts.—Six cases in our series possessed ovaries with relatively large follicular cysts, unilocular or multilocular, lined by modified stroma such as is ordinarily seen just about the developing follicle. Only two cases, as it happened, were from patients with the same diagnosis: of the six cases, there was one manic-depressive, one melancholia, one dementia præcox, one pellagra, one psychosis with mental deficiency, and two general paralysis. Of these cases, only the ovary of the manic-depressive (1167, aged 31) showed an extensive multilocular cyst. In four of these cases, the ovaries were fibrous and in two there was no fibrosis.

Besides these definite follicular cysts, one ovary from a case of dementia præcox, aged 45, was cystic in the sense of containing a large area with many small empty spaces. These spaces occurred in a field which from a descriptive point of view might have been called a fibroma. The origin of this condition remains uncertain. Nothing special characterized this case from the endocrine standpoint.

Tumors.—Two definite new growths were found in the series, both in cases diagnosed "paranoid dementia præcox" (1274, aged 66, and 1139, aged 37). Case 1274 showed a large papillary adenomatous cyst occupying almost the whole of one ovary. The second case, 1139, showed on the left, a cholesteatoma about the size of a small orange. No special features of sex development or endocrine function could be correlated with these findings.

Interstitial Gland Cells.—Two of our 43 cases showed in one ovary of each case a small island of cells in the hilum region, identical in appearance with the interstitial gland cells of the testis. Both cases had been diagnosed "senile psychosis" (1218 and 1195). No physiologically male features were recorded in the clinical record, and no disturbance of endocrine function except obesity in case 1195. However, there were in both cases too few of these cells to have exerted any effective male physiological influence even if it be assumed that such is their function. These cases have been reported in a special paper.[13]

Following Fraenkel,[14] the presence of interstitial gland cells in the human ovary is usually denied. E. A. Schaefer,[15] however, in his text-book (p. 643), states that they may occur in groups in the hilum or scattered in the stroma. In psychotic material, Morse,[9] Borberg,[10] and Fauser and Heddaeus [11] have not recorded their presence, while Forster,[16] specifically states that they were not to be found in her 101 cases.

The significance of this unusual finding must, for the present, be considered undetermined.

The Thyroid.

The histological unit of the thyroid is a closed vesicle, the *alveolus,* or "little belly" etymologically speaking, lined by a single layer of secretory epithelium, containing a secreted substance, the *colloid*. Binding the alveoli together is the interstitial connective tissue, and in this tissue the blood vessels. The ideal "normal" alveolus is round or oblong in cross-section with a diameter of varying size (.045 to 1.0 mm. according to Schaefer [15]), its lining cells are nearly cubical and it contains colloid.

In respect to cell shape and colloid content, an alveolus may differ from this ideal type in two ways. With an increase in the amount of colloid in the lumen, the alveolus becomes larger, its lining epithelial cells flatter, resulting in an aveolus of the "colloid" type (see Fig. 17), the type, which, when it is the only type to be found in a circumscribed region, produces a "colloid" adenoma, or which, filling the whole gland, produces a colloid goitre. With a decrease in the amount of colloid in the lumen, on the other hand, the lining cells become more cylindrical, the wall invaginating in finger-like processes into the empty or nearly empty lumen. This type of

alveolus can, by analogy, be called " exophthalmoid " (Fig. 18) for when it occurs to the exclusion of other types in a circumscribed part of the gland, we have an " exophthalmoid " adenoma and when it is the sole type to be found in a whole gland, we have an exophthalmic goitre.

Another type of alveolus (Fig. 19), one without colloid, but small in size, with broad, cubical, rather lacy cells we have seen only in adenomata of the so-called *" fœtal "* type. Still another type of alveolus we have called the *senile alveolus,* because it is the most common type in old age. It is small and contains colloid, but the epithelial lining is flat. Such alveoli are plentiful in fibrous organs also and may be secondary to the increase in fibrous tissue which is the regular finding in old age. Degeneration of an alveolus (Fig. 20) is shown by the desquamation of epithelial cells into the colloid—where they assume a "Gitter-cell " structure, sometimes containing lipoid—and a replacement of the epithelial lining by fibrous tissue.

Between the alveoli, the vessels and the connective tissue may show changes which are not specific to the thyroid gland, but (*e. g.,* arteriosclerosis, exudate) belong to general pathology. (Fig. 17.)

It is well known that little can be deduced as to the function of the thyroid gland from a study of microscopic sections alone. From block to block, and even from section to section, the appearance varies within wide limits. If, for example, there is an inactive colloidal alveolar area in one slice, the next may show a region of sufficient activity to compensate for the functional deficiency. See, for example, Figs. 17 and 18 made from the same section. Except for extreme cases, any opinion as to the average functioning of a gland based on its histology must be the merest guesswork.

Our study included the thyroid glands of 109 cases. Our chief finding was fibrosis.

Fibrosis.—This change occurred in 90 of the 109 cases. It consisted in a thickening of the interstitial connective tissue, usually associated with a thickening of the walls of the small vessels. Its significance was very difficult to analyze. Apparently in the older cases it was intimately connected with arteriosclerosis. In 70 of the 90 fibrous cases, indeed, the age at death of the patient was over 50. Of the 20 younger fibrous cases, 9 had suffered from

severe tuberculosis, 4 from syphilis, 1 from pellagra; the remaining 6 dying of acute disease, or in 1 case, non-psychotic, of an accident. The psychiatric diagnosis in these cases included all the groups we had for study. Eight of the 9 tuberculous cases were dementia præcox; 4 paralytics are represented; 2 brain tumors; 1 pellagrin; 1 mental defective; 1 psychopathic personality; 1 tuberculous meningitis; 1 non-psychotic accident case. If it should happen to be true that thyroid fibrosis is a characteristic of any one or more psychiatric groups, in our material, where it occurred in 90/109 of all cases, we should not be able to determine which group this was.

Lymphocytes.—(See Fig. 17.) Among the 90 fibrous cases described above, 16 showed an exudate of lymphocytes in one or more parts of the interstitial tissue, mixed sometimes with a few plasma cells. These cases were:

No. 1199, aged 65, general paralysis, death from chronic nephritis
" 1183, " 60, cerebral syphilis, myocarditis.
" 1123, " 65, cerebral syphilis.
" 1159, " 65, arteriosclerotic psychosis, generalized arteriosclerosis.
" 1154, " 69, arteriosclerotic psychosis, generalized arteriosclerosis.
" 1150, " 45, dementia præcox, gangrenous cholecystitis.
" 1174, " 65, manic-depressive, gangrenous lung.
" 1222, " 64, involution melancholia, ulcerative colitis.
" 1252, " 55, involution melancholia, pulmonary and intestinal tuberculosis.
" 1238, " 55, involution melancholia, syphilis, tuberculosis.
" 1256, " 32, epilepsy, pulmonary tuberculosis.
" 1239, " 45, delirium with pernicious anæmia, pulmonary tuberculosis.
" 1153, " 32, pellagra, partial thyroidectomy.
" 1181, " 43, hydrocephalus, tuberculosis of liver, lung, nodes.
" 1286, " 30, mental deficiency, lobar pneumonia.
" 1242, " 43, psychopathic personality, unexplained fever.

This list shows the frequency of severe chronic or subchronic disease and the great variety in the psychiatric diagnoses.

Abscesses.—Case No. 1206, involution melancholia, showed small abscesses in the thyroid as well as in the posterior lobe of the hypophysis, the adrenals, and the left testis. The patient died of an ulcerative endocarditis.

Swelling.—Collections of fluid in the alveoli and in the interstitial tissue were observed in 9 cases. There was no correlation between this finding and the psychiatric diagnosis. The cause of death was

varied: cancer of the pharynx, chronic nephritis, brain tumor, ulcerative colitis, lung abscess, broncho-pneumonia.

The Alveoli.—In 3 cases a few exophthalmoid alveoli were found. These cases were: 1184, aged 60, senile psychosis; 1231, aged 71, arteriosclerotic psychosis; and 1141, aged 74, dementia præcox. In all three cases, the rest of the gland contained only senile and colloid alveoli. No clinical hyperthyroidism was noted. If these alveoli indicated a focal over-actvivity, it was apparently balanced by the functioning of the rest of the gland. Schaefer[25] in his *Text-Book of Microscopic Anatomy* states that such alveoli may occur in normal glands.

More extensive exophthalmoid areas were found in case 1153, pellagra, aged 32, who had been operated upon two years before death for hyperthyroidism.

Fœtal adenoma, of small size, and apparently of insignificant function occurred in two of our cases: Nos. 1139, dementia præcox (Fig. 19), and 1206, involution melancholia.

In the other cases of our series, it can only be stated that where there was a fibrosis, and it will be remembered that there was a fibrosis in 90 cases, the alveoli were very variable in size; though on the whole, under these circumstances, they approached the large colloid type. In some of these cases also, degenerating alveoli were seen, most marked in association with arteriosclerotic changes in cases 1186 and 1195, senile psychoses. No degenerating alveoli were seen in non-fibrous cases. Even in non-fibrous cases, however, the size and type of alveolus varied markedly in the same section.

The outstanding change in the thyroid, then, remains fibrosis. It is not a specific characteristic of any one psychiatric or nosological group. If there is some specific characteristic of one group, fibrosis either as an entity or as a process has concealed it from us.

Size of Thyroid.—Most of the thyroid glands weighed at necropsy between 15 and 35 grammes, but 8 exceeded the upper limit. These belonged to the following cases:

1164, aged 37, general paralysis, 40 grammes.
1127, " 55, general paralysis, 45 grammes.
1186, " 89, senile psychosis, 102 grammes; many calcifications.
1126, " 75, dementia præcox, 54 grammes; calcifications.
1226, " 43, dementia præcox, 43 grammes; only right lobe present
1151, " 59, dementia præcox, 63 grammes.
1140, " 60, manic-depressive, 42.5 grammes; left side large.
1228, " 49, brain tumor, 44 grammes.

In one case (1153) of our series not included in the above list, dying of pellagra at the age of 32, the thyroid may at one time have been large, as there was a history of hyperthyroidism necessitating a partial thyroidectomy two years before death. Case 1226, listed above, in which only the large right lobe was discovered at necropsy examination, will be discussed more fully below. In this case, the right testis was atrophied, the left adrenal hypertrophied. Clinically, there was obesity and hypotrichosis. In the other 7 cases listed above, there was no functional endocrine disorder.

The Hypophysis.

The hypophysis is conventionally divided into an anterior and a posterior lobe. In other animal forms, a *pars intermedia* is present, but in the adult human hypophysis there is no sufficiently differentiated region between the two lobes to warrant this term. The anterior lobe is made up of epithelial cells lying loosely in rows, or approximating an alveolar arrangement, located between wide, thin-walled, sinus-like blood vessels. (Figs. 21 and 22.) Near the capsule these vessels have thicker walls, and in this part of the lobe the connective tissue framework, with which they are connected, is also thicker; while towards the center, the vessels are thin and the fibrous component of the framework almost absent. The cells are of two or perhaps three general types. The *acidophile* cell derives its name from the staining reaction of its cytoplasm, which is filled with very fine acidophile granules. Its nucleus is round, small to medium in size, with a rich chromatin network. The basophile cell has a cell body larger than that of the acidophile cell, filled with large granules that stain bluish with a basic dye such as hæmotoxyline. Its nucleus is larger than that of the acidophile and more oval in shape. Transitional forms are sometimes seen: either predominantly basophile cells with small acidophile inclusions, or predominantly acidophile cells with a peripheral stippling of basophile granules. The *neutrophile* cell plasma stains very poorly, remaining either colorless, or else being tinted slightly in either the acidophilic or the basophilic directon. Its nucleus resembles sometimes the nucleus of the acidophile, sometimes that of the basophile cell.

The acidophile cells occur in general in the central part of the lobe, where the blood vessels are thinnest: among them are a few

neutrophiles with nuclei like the acidophile cells. Basophile cells occur apparently where the blood vessels are thicker or more inaccessible to the cell: in the periphery of the anterior lobe, in the fibrous septum between the two lobes, in vesicles within the fibrous septum (formed on the principle of retention cysts?), or in streaks in the posterior lobe. The neutrophiles associated with them resemble them in respect to the nuclear appearance. This distribution of the three cell types suggests strongly that the neutrophile cell is a stage in the secretory cycle of the basophile and acidophile cells; and that the acidophile cell is one which is discharging its secretion into the circulation without hindrance, while the basophile cell is one whose secretion is being dammed back and stored in the cell. Of this, however, we cannot be certain; several conflicting theories on this point are current. The acidophilia of actively functioning hypophyseal tumors, however, lends some plausibility to this idea.

Colloid occurs in the hypophysis in the vesicles of the fibrous septum to which we have alluded, and as small droplets in the anterior lobe, usually lying among basophile cells. Its significance we do not know. Perhaps it is secretion not absorbed through the walls of the blood vessels.

The posterior lobe and most of the stalk is made up of cells and fibers of neuroglial origin. Relative to the anterior lobe its blood supply is poor. In some of the cells and apparently loose in the tissue are clumps of coarse, yellowish-green pigment granules. (Fig. 23.) Occasionally small serous or colloid pink staining droplets are to be seen. That these represent the anterior lobe colloid droplets in transit to the third ventricle seems dubious. at any rate in human beings, notwithstanding the experimental evidence adduced by Herring in thyroidectomized animals.

Large Hypophyses.—In our series of 105 hypophyses, the large majority weighed between .45 and .80 gramme. There were 6 which weighed .90 gramme or over. These were:

Case 1204, general paralysis	1.0	grammes
" 1226, dementia præcox	1.1	"
" 1238, melancholia, luetic meningitis	0.95	"
" 1143, febrile delirium	0.9	"
" 1228, brain tumor	0.9	"
" 1233, brain tumor	1.3	"

Case 1238 showed an extension of the syphilitic inflammatory processes from the brain into the anterior lobe of the hypophysis; case 1226 showed a small adenoma of the anterior lobe: the patient was of the Fröhlich type. Case 1143, delirium due to acute peritonitis, had male hair distribution, but was not otherwise remarkable. Of the brain tumor cases, case 1228 had female hair distribution, while case 1233 did not.

Adenomata.—A small adenoma was encountered in one case in the series (case 1226, mentioned above). It consisted of round neutrophile cells, similar to the "chromophobe struma" type of Cushing. The patient was definitely of the Fröhlich type of dystrophia adiposo-genitalis.

In case 1249, senile psychosis, dying at the age of 102, a small area made up of reticulating strands of basophile cells was seen in the anterior lobe. The patient was of the hypogenital type. Because of senile fibrous changes, it could not be definitely ascertained that the area represented an adenoma, though this seemed quite probable.

Fluid.—Four glands showed free fluid: case 1230, senile psychosis; case 1233, brain tumor; case 1208, arteriosclerotic psychosis; and case 1220, epilepsy.

Thrombosis and Softening.—This was found in case 1259, paranoic condition, death due to lobar pneumonia and cardiac dilatation. A similar lesion was found in the adrenal glands.

Abscesses.—Small abscesses were found in the hypophysis as well as in the thyroid, adrenals, and left testis of case 1206, involution melancholia, dying of ulcerative endocarditis.

Acidophilia and Basophilia.—Nine cases showed such a predominance of acidophile cells in the anterior lobe that we could separate them as a small group from the rest of the series. Five cases showed a similar relative basophilia. The acidophile cases were: 2 of general paralysis (Nos. 1164, age 37, and 1205, age 40); 1 of senile psychosis (1184, age 60); 2 of arteriosclerotic psychosis (1231, age 71, and 1192, age 68); 1 of true dementia præcox (1131, age 52); 1 of doubtful dementia præcox (1255, age 58); and 2 of involution melancholia (1222, age 64, and 1206, age 68). Except for the 2 paretic cases, all these were of advanced years, but the significance of the finding is not clear.

The five basophile cases were: 1125, age 62; 1168, age 36; and 1161, age 30, 3 cases of dementia præcox, dying of tuberculosis; 1129, age 25, dementia præcox, dying of acute myocarditis; and 1187, age 59, paranoic condition, dying of cardiac dilatation in lobar pneumonia.

Fibrosis.—As in the other organs we have discussed, the most common finding was fibrosis, a thickening of the capsule and of the supporting connective tissue of the gland. It occurred in 67 of the 105 glands studied, in 6 cases along with a lymphocytic inflammatory change. The change occurred in every clinical type represented in the series. It was especially common in old age. Indeed, only 13 of the 67 cases were under 45 at the time of death. Of these 13, 4 were paretics, 2 patients with tuberculous meningitis. The other 7 belonged each to a different clinical group. In 3 cases of the 13, an inflammatory lymphocytic exudate was present (1241, general paralysis; 1236, dementia præcox, death from tuberculosis; 1227, tuberculous meningitis). There thus seemed to be no correlation between fibrosis and the psychotic picture, the important conditioning factors being, apparently, age and inflammation.

Lymphocytic Exudate.—The 6 cases referred to above as showing a lymphocytic inflammation were: 2 cases of general paralysis (1171, 1241), 2 of dementia præcox (1226, 1236), 1 of involution melancholia with syphilitic meningitis (1238), and 1 of tuberculous meningitis (1227). One of the paralytic cases (1241) showed a marked inflammatory exudate of lymphocytes and endothelioid cells extending from the brain along the anterior border of the stalk and into the capsule of the anterior lobe. (Figs. 24 and 25.) The case in which there was a syphilitic meningitis (1238) showed a similar process, with several small giant cells included in the inflammatory tissue. (Figs. 26, 27.)

The Adrenal Glands.

Anatomy.—The adrenal gland consists of a cortex and a medulla. The medulla has a flat, irregular shape, something like a short, flattened, lumpy icicle, or a solidified lead stalactite hanging from the rim of a plumber's bucket. Covering it is the cortex, of fairly uniform thickness, dipping into the depressions between the lumps of the medulla and investing the large central vessels as they enter;

so that, in section, a ring of cortex is usually seen about them even in the center of the medulla. The cortex is generally divided into three zones: beginning at the outside, the glomerular, the fascicular, and the reticular zone. This division is based on the arrangement of the cells into glomeruli (though this is not very striking), fascicles (bundles), and reticulating strands. The cells of the cortex differ slightly in the three zones. The outer layer contains rather small, compact, finely granular cells with little lipoid pigment. The middle layer contains larger cells, some of the strands being made up of cells with compact cytoplasm, while between these compact cell rows are patches of cells loaded with lipoid droplets, which dissolving out in the course of the embedding and staining processes leave these cells with an apparently widely reticulated cytoplasm. A Scarlet R stain brings out the patchy nature of this lipoid distribution (Fig. 28). The same stain shows that the compact cells contain a stippling of very fine lipoid granules. In the reticular zone, the cells are larger and contain on the whole more lipoid pigment than those in the other zones. A fibrous framework, continuous with the capsular connective tissue, extends in between the rows of cells and carries the cortical blood vessels.

The medulla cells lie in loosely reticulating strands, held in loose fibrous tissue that contains many large blood sinuses. In formaline fixed material, with a hæmatoxyline stain, the cells show a bluish, finely granular cytoplasm. The cell outline is as a rule poorly preserved. In some cells vacuoles or acidophile droplets occur. The nucleus may be larger, paler and more oval, or else smaller and darker than the nucleus of the cortical cell, fixation and agonal changes being the decisive factors here. A few large nerve cells of the sympathetic ganglion type are occasionally found among the other cells. Near the hilum, the large vessels are seen, and usually, around them, a collar of cortex tissue. Near these vessels the supporting framework is thicker and more fibrous than in the other parts of the medulla, and this fact must be taken into account when the presence or absence of pathological fibrosis is under consideration. Because of the irregular shape of the medulla, peninsulas of cortical tissue extending into the medulla are quite common.

Weight.—The average weight of an adrenal gland for the 73 cases in which the organ was weighed at autopsy was 8.40 grammes, with an average deviation of ± 2.85 grammes. In 13 of these cases,

the average weight was below 6.5 grammes. In 12, it was above 11.5 grammes. The following tables show the clinical grouping of these extreme cases:

TABLE II.

SMALL ADRENALS.

Group	No. of cases	Per cent of group
Cerebral syphilis	1	50
Senile	2	25
Dementia præcox *	8	33
Involution melancholia	2	40
Total Series	13	17.8

TABLE III.

LARGE ADRENALS.

Group	No. of cases	Per cent of group
General paralysis	3	33
Dementia præcox	4	16.7
Epilepsy	1	25
Brain tumor	1	100
Traumatic psychosis	1	100
Hydrocephalus	1	100
Epidemic encephalitis	1	100
Total Series	12	16.4

From a consideration of these tables, it appears that unusually large and unusually small adrenal glands could be found in our dementia præcox group. This finding will be discussed more fully below (p. 438). In general, the cases with large adrenals were young (below 45), those with small adrenals old (above 55) and this fact seems to be more significant than the clinical grouping. Pathological changes in these cases played a certain rôle, but this will not be considered here.

Although as a rule, the weights of the right and left adrenals from the same case were approximately equal, in 7 cases there was a sufficient inequality to deserve notice. These cases are tabulated below:

* Includes one clinically doubtful case.

TABLE IV.

ADRENALS OF UNEQUAL WEIGHT

Case	Group	Right adrenal	Left adrenal	Sex	Remarks
1155	General paralysis....	6.0 gms.	12.0 gms.	M	
1260	General paralysis....	15.5	23.0	F	
1185	Senile	6.0	3.7	M	
1226	Dementia præcox...	12.0	20.0	M	Atrophy right testis.
1214	Brain tumor.....	4.7	8.0	M	Undeveloped testes.
1246	Epilepsy	20.0	15.0	F	
1243	Traumatic	12.0	20.0	M	

Case 1214 had functional hypogenitalism. Case 1226 had feminine hair distribution. The inequality in weight apparently depended on factors other than the psychotic condition.

Cortex Thickness.—Of our 112 cases, 90 had cortices which measured between 8.0 and 12.0 mm. in thickness. The exceptions were 9 cases in which the cortex was thicker than 12 mm., and 14 in which it was thinner than 8 mm. The cases with thick adrenal cortex belonged to the following clinical groups: general paralysis 2, senile 1, arteriosclerotic psychosis 1, dementia præcox 3, hydrocephalus 1, brain tumor 1. The 14 with small adrenal cortex were distributed as follows: general paralysis 3, senile 1, arteriosclerotic psychosis 3, dementia præcox 2, dementia præcox doubtful 2, tuberculous meningitis 1, amaurotic idiocy 1 (age 13), "normal" accident case 1. Age and sex seemed to play no part in determining the thickness of the cortex. It is perhaps noteworthy that two of the dementia præcox cases and the brain tumor case with thick adrenal cortices showed undeveloped testes.

Fibrosis.—Histologically, the most widespread change found was fibrosis. (Fig 29.) In our 112 cases this was present 63 times; that is, in slightly over one-half of all the cases. In 53 of these 63 cases, the fibrosis was accompanied by an exudate of lymphocytes in the cortex, in the medulla, or in both parts; and in two cases there were full-fledged tubercles.

When we attempt to correlate the fibrosis with clinical facts, we find that of the 63 cases, 49 were over 50 at the time of death; and in these cases, without exception, the blood vessels showed a certain degree of atherosclerosis. Among these older cases was included one of the cases with miliary tubercles, and no doubt intercurrent

disease played a part here as in the younger cases in determining the fibrosis. This will be considered more fully below. Besides the older cases, however, there were among the 63 cases 14 in which the age at death was below 50. It is striking that 7 of these came from patients in the general paralysis group—a large proportion when it is recalled that general paralysis furnished only 17 cases in the series. It is even more striking when it is seen that among the older cases with fibrosis (and exudate) 6 other paralytic cases occurred. The remaining 7 of the 14 young fibrous cases were distributed as follows: dementia præcox 2, epilepsy 1, organic miscellaneous 3, mental defective 1. The 2 dementia præcox cases, and 2 of the organic cases died of tuberculosis.

Tuberculosis, indeed, was present in 15 of the fibrous cases. Twice, as we have stated, the adrenals themselves contained miliary tubercles. Tuberculosis as a possible source of the fibrous change is not to be ruled out.

So far as we could see, then, the fibrosis of the adrenal gland was non-specific, in that it was not to be correlated with any single factor. Age, syphilis, and tuberculosis seemed to be the three prominent agents in its causation. Other factors, if they were present, could not be determined.

Lymphocytosis.—In our discussion of fibrosis, we stated that in 53 of the fibrous cases there was an accompanying lymphocytic exudate. In 15 more cases, this exudate was present without a fibrosis. In 4 of these cases there was syphilis (2 general paralysis, 2 cerebral syphilis); in 4 others, active tuberculosis; in 1, cancer; in 2, pneumonia; in 3, cardio-vascular disease; while 1 died of an accident.

Although we have lumped all the cases which showed lymphocytes together here, their presence seemed to depend on one of two different processes. One of these processes was ordinary inflammation in the usual sense. The other was the scavenger process of senility and arteriosclerosis; here, the lymphoid cells were in part laden with a lipoid pigment which, apparently, it was their function to carry away along the vessel sheaths. In general the presence of lymphocytes in the adrenal indicated the presence of one or both of these processes.

Lipoid.—Three of the 112 cases showed no lipoid pigment: case 1160, dementia præcox, death due to tuberculosis; case 1220,

epilepsy, death due to broncho-pneumonia, marked œdema of the adrenals; case 1227, tuberculous meningitis. For the other cases it would be hazardous to attempt any classification according to the quantity of lipoid present. There may occur in the adrenal cortex a phthisical or cancerous lipoid "degeneration" (Aschoff [17]); that is to say, an increase in lipoid due to chronic disease, and to determine what was normal lipoid in our cases and what was due to disease, lay beyond the scope of our study. In all cases with arteriosclerosis, as we have stated, there was evidence of a scavenger activity of the lymphocytes, in relation to lipoid. A determination of the type of lipoid present in the different cases also lay beyond our study.

Thrombosis.—In the case which showed a thrombosis of the hypophyseal blood vessels (1259, paranoic condition, arteriosclerosis) the adrenal vessels were similarly affected, and there were small softenings in the adrenal cortex. This condition is mentioned by Aschoff [17] as part of the arteriosclerotic degenerative process in the adrenal gland.

Adenoma.—A small adenoma was found in the medulla of the adrenal gland in case 1255, dementia præcox doubtful. Nothing in the clinical history could be correlated with this finding.

PART II. FUNCTIONAL-ANATOMICAL CORRELATIONS.

After the material had been analyzed from the standpoint of the type of lesions present, the clinical and necropsy records were consulted in order to ascertain whether any functional disturbances such as are generally attributed to endocrine influence were observed in the individual patients.

Female Cases.

In the female material 5 such disturbances were listed: (1) male hair distribution, (2) premature menopause, (3) infantile uterus, (4) obesity, (5) hyperthyroidism.

1. *Male Hair Distribution.*—Anomalies in the hair distribution of psychotic patients have been described in the clincal-functional studies of Gibbs.[18, 19] So far as the clinical and necropsy records furnished us with the information, a hair distribution of the male type was observed in two female cases. In one of these (1137),

a case of general paralysis with brain gummata, there was a fibrous inflammatory process in the ovaries, and a slight exudate in the moderately thick adrenal cortex. In the other case (1143), delirium due to acute peritonitis, there was an acute fibrinous oöphoritis, a large hypophysis, and fibrous changes in the thyroid, the adrenal cortex being moderately thick. With these discrepant findings and this meager material, no definite correlation between endocrine anatomy and hair distribution could be drawn with any assurance.

2. *Premature Menopause.*—Case 1180, pellagrin, age 53 at death, menopause at 32, showed typically senile ovaries. The case has been discussed above (p. 397).

3. *Infantile Uteri* (2 cases).—Case 1186, senile psychosis, age 89, showed a large thyroid with degenerative changes. Otherwise, this case and the other one also (1262, involution melancholia, age 67) showed only senile changes in the endocrine organs.

4. *Obesity.*—In case 1195, senile psychosis, the patient weighed 275 lbs. at death. One ovary showed an island of interstitial cells. Otherwise, the endocrine organs showed only senile changes.

5. *Hyperthyroidism.*—Case 1153, pellagra, age 32, partial thyroidectomy at 30, showed fibrous changes in the ovaries, lymphocytic exudate in the adrenal, no special hypophyseal changes, and fibrous-inflammatory changes in the thyroid, in which also, areas of exophthalmoid alveoli were to be found.

In these cases, then, the correlations between structure and function that seem certain are: (1) premature menopause—prematurely senile ovary; and (2) hyperthyroidism—exophthalmoid areas in thyroid. Other correlations would be insecure.

Male Cases.

Hypertrichosis, hypotrichosis with feminine distribution of the pubic hair, and Fröhlich's syndrome constituted the functional endocrine changes noted among our male cases.

1. *Hypertrichosis* (4 cases).—Table V summarizes the anatomical findings in these cases.

No particular correlation of endocrine anatomy and hypertrichosis could be made from this material.

2. *Fröhlich's Syndrome.*—Four cases presented a syndrome of obesity, feminine habitus and absence of body hair except for pubic

TABLE V.

HYPERTRICHOSIS.

Case	Testes	Hypophysis	Thyroid	Adrenals	Diagnosis
1241	Inflammatory. Reduced int. cells.	Inflammatory.	Fibrous.	Fibrous.	General paralysis.
1290	0	0	0	0	General paralysis.
1243	Inflammatory. Reduced int. cells.	0	Fibrous.	0	Traumatic psychosis.
1221	Inflammatory. No reduction in int. cells.	0	Fibrous.	Tubercles.	Tuberculous meningitis.

hair of feminine distribution, in three of the cases associated with underdevelopment of the testes and the external genitalia. The endocrine anatomical findings are shown in Table VI. See also Figs. 6, 7, and 8.

TABLE VI.

FRÖHLICH'S SYNDROME.

Case	Diagnosis	Age	Testes	Hypophysis	Adrenal	Thyroid
1249	Senile.	102	Undeveloped.	Fibrous; adenoma?	Senile changes.	Senile changes.
1253	Dementia præcox.	72	Undeveloped.	Fibrous.	Fibrous; degenerative changes.	Fibrous.
1214	Brain tumor.	40	Undeveloped. Inflammatory changes.	Not removed.	Unequal; Rt. 4.7 g. Lf. 8.0 g.	Not unusual.
1226	Dementia præcox.	60	Right testis not found at autopsy. Left small.	Weight; 11 g. Adenoma.	Unequal; Rt. 12 g. Lf. 20 g.; Left cortex hypertr.	Only the right lobe developed. Weight 43 g.

3. *Hypotrichosis.*—The following 4 cases showed hair distribution of the feminine type, but no other feature attributable to disorders of the endocrine functions: (1) case 1245, age 60, general paralysis; (2) 1202, age 45, general paralysis; (3) 1228, age 49, brain tumor; and (4) 1227, tuberculous meningitis, age 25. In the brain tumor case (1228) the hypophysis weighed 0.9 gramme; otherwise no peculiar changes were noted in the endocrine organs of these cases. A diminution in spermatogenetic activity occurring in case 1227 and 1228 was associated with fibrous-inflammatory changes.

In our male cases, then, we were able to correlate hypogenitalism with feminine hair distribution in 4 cases, with inequality in adrenal weights in 2 cases and with large hypophyses in 2 cases. The material will permit of no further correlation of anatomical and functional endocrine findings.

PART III. ANATOMICAL—PSYCHIATRIC CORRELATIONS.

Up to this point in our study, we have in the first place recorded our anatomical findings, classifying our material by them so far as we were able. We then briefly indicated certain correlations between some of our findings and certain well-recognized functional endocrine disorders noted clinically in the patients. In the following pages, we shall consider the anatomical findings in connection with the psychiatric diagnosis.

General Paralysis.

Testes (10 cases).—In 5 of the 10 pairs of testes, we found extra-tubular fibrosis. In 3 of these 5 cases, it was patchy, the fibrous growth being around small thickened vessels which showed typical syphilitic changes: endothelial proliferation, and adventitial cellularity. These 3 cases were uncomplicated by tuberculosis. In the other 2 of these 5 cases, where death was due to a severe pulmonary tuberculosis, there was a marked general extra-tubular fibrosis, not limited to patches about the vessels. In both of these cases there was a lymphocytic exudate. In 4 cases between the age of 50 and 60, and in 3 of the younger cases in which the fibrous-inflammatory changes occurred, spermatogenetic activity was reduced. In the older cases, and in those with extra-tubular fibrosis, the interstitial gland cells were reduced in number. The germinal epithelium was swollen in cases 1205, dying of a terminal pneumonia; 1202, cardiac decompensation; 1241, cardiac failure; and 1130, "gradual failure."

In the testes of this group, then, in half of the cases, a patchy, extra-tubular fibrosis, apparently dependent on local vascular changes was found. Where complicated by tuberculosis, the fibrosis was more general and more intense. Reduction in spermatogenetic activity seemed to depend on senile or inflammatory changes.

Ovaries (6 cases).—All these ovaries showed the patchy, streaky fibrosis we have described on page 401, associated with proliferative changes in the vascular endothelium, and a diminution in ovum production. (See Fig. 15.) In one case there was a scattered lymphoid exudate. With Mott we agree that such changes are syphilitic or possibly gonorrheal. Changes similar in principle in such organs as the adrenal glands of the same case demonstrate, however, that gonorrhea is not indispensable.

Hypophysis (16 cases).—In 10 of the 16 hypophyses in the general paralysis group, there was a fibrosis, a thickening of the connective tissue framework of both lobes of the gland. In 2 of these cases (Nos. 1171 and 1241) there was a marked inflammatory reaction, an exudate of lymphoid and plasma cells extending down the anterior border of the stalk and along the upper part of the capsule of the anterior lobe. (Figs. 24 and 25.) Two cases with slight fibrosis showed a high grade of acidophilia (No. 1164, age 37, and No. 1205, age 40). The hypophysis of case 1204 weighed 1.0 gramme. No posterior lobe changes were noted except that in the youngest case (1130, age 21) there was a green pigment. Thickened blood vessels occurred in the two older cases (1199, 1142) and in the 2 cases with the exudate.

In summary, then, there was a fibrosis in 10 of the 16 cases, associated in 2 cases with a definite extension of the inflammatory process from the pia.

Adrenals (17 cases).—The most striking change noted in this material was fibrosis, which was present in 13 of the 17 cases. Furthermore, it did not occur only in cases above the age of 50: 6 of the cases were older than this, but 7 were younger at the time of death. In all but one of the fibrous cases, there was an exudate of lymphoid cells and plasma cells, in the cortex, medulla and capsule, and in two cases endothelioid cells in the capsule and cortex. In addition, one non-fibrous case showed an extensive exudate of the same sort. In other words, in 14 cases, there was either fibrosis, exudate, or both fibrosis and exudate. Endothelial proliferation and a fibrous thickening of the blood vessels was present in all these cases. In only two of them was there tuberculosis which might have played a rôle in the fibrous inflammatory process. We are inclined, therefore, at present, to believe that syphilis plays the

major part in these changes. Jahnel stains did not reveal the spirochæte. Fig. 29 illustrates the fibrosis with exudate.

Lipoid was present in all these cases. We have no gauge as to possible diminution or increase. Two cases (1232, 1260) had thin cortices; the former died in convulsions, the latter of lobar pneumonia.

Three cases had adrenal glands weighing over 11.5 grammes each. Case 1155, male, had unequal adrenal glands; the right weighed 6.0, the left 12.0 grammes. Case 1260, female, had a right adrenal gland weighing 15.5, and a left one weighing 23.0 grammes.

The adrenal (case 1137) of the woman with male hair distribution showed no unusual features.

Thyroid (16 cases).—Fibrosis was found in 10 of the 16 cases. It was associated with thickening of the blood vessels, and in 1 case (1199) with a lymphoid exudate and with degenerative changes in the alveoli. In these cases both large and small alveoli were found. Where the fibrosis was diffuse and delicate, smaller alveoli were the rule. Where it was distributed in thick bands, the bands tended to separate areas of large alveoli from areas of small alveoli. In the 6 non-fibrous cases, no unusual features were noted. The 3 youngest cases (1137, 1290, 1130) did not show fibrous changes.

Cerebral Syphilis.

Testes (2 cases).—In the testes of the older case (1124, age 65), there was an extra-tubular fibrosis, a thickening of the blood vessels, and a reduction in spermatogenesis and in the number of interstitial cells. In the younger case (1275, age 30) there was a patchy fibrous-inflammatory change in the extra-tubular tissue without marked changes in spermatogenesis or in the interstitial cells. The change was like that seen in three of the cases of general paralysis, depending, no doubt, on the same factors.

Ovaries (1 case).—In case 1183, age 60, the ovaries were of the senile type, but with adhesions on the surface and a patchy fibrosis similar to those noted for the general paralysis group.

Hypophysis (3 cases).—Fibrosis was noted in case 1123. In case 1238, listed under "Involution Melancholia," dying of a syphilitic meningitis, there was an extension of the inflammatory process from the pia into the capsule of the anterior lobe, the

exudate containing several small giant cells (Figs. 26, 27). There was no special acidophilia or basophilia.

Adrenals (4 cases).—Three of these cases showed fibrosis and vascular changes, 1 of them , 1238, showing an extensive lymphocytic exudate in the cortex and medulla as well. This case was complicated by tuberculosis. No change in the lipoid content was noted. Case 1123 had small adrenals.

Thyroid (4 cases).—In 3 of the 4 cases there was a fibrosis with an extensive lymphocytic exudate. All 3 cases were over 55, the other case being 32 at the time of death. No other changes were noted. The alveoli were usually small.

Senile Psychosis.

Testes (8 cases).—With old age there takes place in the testes a degeneration of the germinal tissue, a wrinkling and thickening of the connective tissue wall of the tubule, usually with intra-tubular fibrosis, and degenerative changes in the extra-tubular connective tissue and vessel walls. (See Fig. 4). Among the 8 cases of the group under discussion, there were 6 in which there was no tuberculous complication, and these 6 showed the senile changes in the most exaggerated possible degree. It seemed that in the testes as in the brain, there was in the senile psychosis group a hastening and exaggeration of the degenerative processes of old age. In the 2 cases with a tuberculous complication, there was a different state of affairs; the extra-tubular degenerative changes were covered over and masked by general fibrosis and cellular proliferation such as we found in the other tuberculous cases in our series. In one of these there was a lymphocytic exudate. The contrast between the tuberculous and non-tuberculous cases was very striking. In all 8 cases, spermatogenetic activity was more markedly reduced than in any other clinical group, even when the organs were compared with cases of the same age. (Compare Figs. 11, 12, and 13.)

Ovaries (6 cases).—The ovaries were all "senile" in the anatomical sense, but unlike the testes, showed no more atrophy than those from persons of the same age in the other clinical groups. In 2 of the cases, interstitial gland cell islands were found in the hilum of one ovary. This finding has been discussed on page 403.

Hypophysis (13 cases).—Atherosclerotic vascular changes occurred in all cases of this group. In 9, there was fibrosis. Marked acidophilia occurred in 1 case (1184); basophilia in 1 case (1185); while case 1249, age 102, with hypogenitalism and obesity, showed a questionable adenoma of the anterior lobe. The posterior lobe in all cases was deeply pigmented. In case 1230, there was an œdematous condition of the hypophysis, death being due to abscess of the lungs.

Adrenals (14 cases).—Atherosclerosis was present in all cases. In 12 there was an extensive fibrosis, in 11 a lymphocytic exudate. In one of these cases (1203) there were several miliary tubercles. In the oldest case of this group (1186), no medulla were seen. Fluid was found in case 1230 (v. s.). Unusually small glands were encountered twice; glands of unequal weight once (case 1185).

Thyroid (14 cases).—Atherosclerotic changes were present in all cases. In 13, there was a marked fibrosis, associated in 1 case (1195) with a lymphocytic exudate. Three cases (1132, 1230, 1229) showed fluid. Degenerated alveoli (Fig. 20) were found in two cases (1186, 1218). Otherwise the alveoli were generally of the senile type referred to on page 404.

Arteriosclerotic Psychosis.

Testes (7 cases).—In 3 of the 7 cases, the testes showed the usual findings of old age. In 2 others (1138, 1147) there was a slight, patchy, extra-tubular fibrosis associated with a local sclerosis of the small vessels. In the one case (1135) in which there was a tuberculous complication, there was also an extensive general extra-tubular fibrosis. This parallels our experience with the general paralysis and senile groups. In the one case where no fibrosis was found (case 1208), spermatogenesis seemed unimpaired. In the other cases, spermatogenesis was reduced. The impression was gained from this material that the presence of testicular changes in the arteriosclerotic groups depended on the presence of a sufficiently severe local arteriosclerosis.

Ovaries (4 cases). Vessel thickening and the usual senile changes occurred in all four cases. In 2 of them, a few lymphoid cells were found in the hilum near large degenerating vessels.

Hypophysis (11 cases).—All the cases showed marked fibrosis except 1, case 1138, age 50. The vessels were thickened. Two old cases, 1231, age 71; and 1192, age 68, showed an unusually acidophile anterior lobe. Other cases of similar age, and with similar vascular involvement did not show this feature. The green pigment of the posterior lobe was unusually abundant in cases 1200 and 1192.

Adrenals (11 cases).—The average weight of the adrenal gland for this group was 8.25 grammes with an average deviation of 1.75 grammes. Atherosclerosis was present in all cases. In eight of the cases, there was marked fibrosis, one of the cases (1257, aged 83), showing fibroblasts with mitotic figures in the capsule. In 7 of the cases, there was a lymphoid exudate; in these cases, the lymphoid cells contained lipoid pigment. This point has been discussed on page 414. They seemed to be taking part in a degenerative process. In the case in which fibrosis and exudate were most marked (case 1135), death was due to an active tuberculosis.

Thyroid (10 cases).—Fibrosis occurred in 9 cases, a lymphoid exudate in 2 of these 9. Arteriosclerosis was present in all these cases. The alveolar changes resembled those in the senile group. In one case (1200), there was a lipoid degeneration of the colloid in several of the larger alveoli. In another (1231), one small exophthalmoid area was found.

Dementia Præcox.

Testes (16 unquestioned, 2 doubtful cases).—The testes from dementia præcox patients have been the subject of much study, and certain hypotheses designed to account ætiologically for dementia præcox have depended in part on findings in these organs. Mott[1, 2, 3, 4] and his co-workers, Prados y Such,[5] and Matsumoto[20] in particular, have described certain regressive changes in the germinal epithelium, which Mott has undertaken to interpret as due to an inherent nuclear defect, affecting not only the testes but also the brain. This nuclear defect, which manifests itself by a reduction in spermatogenesis and tinctorial abnormalities in the nucleus, finally by a complete absence of germinal cells in the tubules and by fibrosis, is due according to this theory to a deficiency of "vital impulse" in the make-up of the schizophrenic. This vital impulse he points out is the same dynamic force which Bergson calls the *élan vital* and Jung the libido. Thus Mott apparently

attempts to harmonize his findings with broad vitalistic and psychoanalytic principles. These findings have been confirmed by Lewis.[8]

In our 16 cases of undoubted dementia præcox, as well as in the 2 cases we have designated "doubtful," our point of departure was general cellular pathology as applied in the consideration of the other clinical groups. In the senile group we have seen that although the regular finding is a much thinned acellular connective tissue, yet in the 2 cases which had an active tuberculosis in other organs, and in these 2 cases alone, the extra-tubular tissue showed a surprising cellular and fibrous proliferation. In our general paralysis group, the 2 cases which were most markedly fibrous also had an active tuberculosis. Indeed, only one of the 17 tuberculous cases in our entire series (case 1256, epilepsy) failed to show this change. Accordingly, we could not ignore tuberculosis as a possible explanation of extra-tubular cell and fiber increase when we found that of the 7 dementia præcox cases which showed this change, the fatal outcome was due in 5 to an active tuberculosis. The sixth of these (1158) had a history of gonorrhœa and died, with marked emaciation, of a cancer of the stomach with metastases.* In the seventh case (1129), dying of acute myocarditis with œdema 6 months after the onset of the psychosis, no tubercular process was observed, and no history of gonoccocal infection recorded. In our own minds, we should prefer to check this case off as "unexplained."

To return for a moment to the 5 tuberculous cases. These fell into two groups: (1) Three cases showed marked reduction of spermatogenesis, no mitoses, no spermatozoa, the germinal epithelium containing dark, shrunken nuclei. (2) Two cases of which one showed a few spermatozoa, while both contained mitotic figures in the usual proportion, although the germinal cells as a whole were reduced. Thus the first 3 cases showed very badly damaged spermatogenesis; in the last 2 cases, spermatogenesis, though impaired, was still active. These 5 cases may serve perhaps as a basis of comparison of the two prevailing points of view—the vitalistic and mechanistic. Mott and his co-workers claim that the severity

* Cf. on page 445, case 1144, delirium with cancer of the pharynx, where the same changes occurred. Mott[4] has reported one case, and Matsumoto[20] two cases of cancer in non-psychotic subjects, where similar testicular changes were present.

of the histological changes in the testes is roughly proportional to the duration of the mental condition, the brain cell nuclei and the germ cell nuclei losing their vital impulse—*élan vital,* libido—at approximately the same time. According to this conception, a case of long duration would show more testicular changes than a case of lesser duration. In contrast to the *vital impulse* theory, it might be held that the severity of the pathological changes in the testes was not proportional to the duration of the schizophrenic state, but that the alterations might have been dependent on such factors as bacterial virulence and individual resistance. From this, it would follow that the interpretation of the findings was independent of the duration of the mental state.

The vitalistic theory, as far at least as our 5 cases are concerned, seems to be of less value as an explanatory concept than the point of view suggested above. The 3 pairs of testes most severely affected came from cases of comparatively short duration. (Cases 1168, 12 years, age 36; 1161, 6 years, age 30; 1162, 6 years, age 29.) On the other hand, the two pairs of less affected testes belonged to patients whose psychosis had lasted from 3 to 6 times longer. (Cases 1124, 38 years, age 62; 1152, 35 years, age 60.) However, if we consider the general peculiarities of the tuberculous process regardless of a general biological theory, it is quite conceivable that testes from different individuals might and probably should show as many pathological-anatomical differences as tuberculous lungs or tuberculous intestines taken from different individuals. Fig. 2 from Case 1162 is shown for comparison with Fig. 3, hydrocephalus with tuberculosis. We shall have occasion to return to this question in connection with the non-fibrous cases.

The 2 doubtful cases of dementia præcox which were mentioned above may now be briefly considered. Both had active tuberculosis. The testes of both showed marked extra-tubular fibrosis. In one case (1255), the spermatogenetic activity showed approximately the same degree of reduction as in the older cases just cited. In the other case (1212), no marked reduction was observed despite the fact that the psychosis was of 10 years duration.

Of the 2 fibrous cases without tuberculosis, one, (1158) dying of cachexia due to cancer, with a history of gonorrhœa, showed a

high degree of degeneration of the germinal cells. The right testis showed a complete germinal cell atrophy, with a fibrosis of all the tubules; the left was approximately in the same condition. The duration of the psychosis was over 13 years. In the second of these cases (1129), the right testis showed an almost complete intratubular fibrosis; the left showed no reduction of spermatogenetic function. The germinal epithelium showed cloudy swelling-duration of psychosis 6 months. The disparity between the amount of damage and the brief duration of the psychosis in this case, as well as the marked difference between the two testes, challenges the vitalistic theory; unless we are to assume the existence of specific lævo-tropic and dextro-tropic vital impulses which may act independently of each other, and bring about advanced pathological changes in one testis while leaving the other almost intact. It seems more plausible to think of mechanical or infectious agents which might act unilaterally or bilaterally, as the case may be.

Of the remaining 9 of the 16 cases, 2 (1253 and 1226) showed a real lack of development of the testes. Case 1253, aged 72 at death, had testes typically senile except for their extremely small size; the tubules were of infantile dimensions and showed intratubular fibrosis. (See Fig. 7). Interstitial cells were few, heavily pigmented, and arranged in islands. The patient was an obese individual with very small genitals and no beard. Case 1225, aged 60 at death, was also obese; pubic hair was of the female type; hair was absent from any other part of the body. The right testis was not found at autopsy; either it had never developed or was atrophied in a hernia. The left testis showed areas of intra-tubular and extra-tubular fibrosis, such as that seen in our arteriosclerotic testes. Indeed, the patient died of a cerebral hemorrhage, and his vessels showed arteriosclerotic changes. A great number of germinal cells, mitoses, and mature spermatozoa were observed in the tubules not involved in the fibrotic process. The interstitial gland cells were numerous and contained little pigment. This case, unlike the first, had a large hypophysis and a hypertrophied left adrenal cortex.

Here, then, are 2 cases of testicular deficiency combined with real functional endocrine disturbances. The clinical histories, while lacking in detail, give the impression that the dementia præcox features were superimposed upon mental deficiency. However, the

psychotic content was typically schizophrenic, whatever the pre-psychotic personalities.

We have so far discussed 7 real and 2 doubtful cases of dementia præcox which showed a marked extra-tubular fibrosis. In 7 instances we attributed these changes to tuberculosis, in 2 instances to other factors. The characteristic finding was a marked reduction in spermatogenesis, which, as it happened, was more marked in certain cases of 6 to 12 years duration, than in cases with a duration of several decades. The germ cell damage seemed to us to be the result of an accompanying disease rather than of intrinsic factors, specific to the psychosis. Two additional cases exhibited marked endocrine functional disturbances accompanied by gonadal deficiency.

The 7 cases still to be discussed are differentiated from the others, first, because of the absence of extra-tubular fibrosis, and second, because neither lack of gonadal development nor general physiological endocrine changes were in evidence. Small as this group is, it seems to us of theoretical importance in view of the following considerations. In the 7 cases reviewed above, in which there was an extra-tubular fibrosis and spermatogenetic reduction, these changes might have been attributed to an asthenia of the life force and its corollaries, or else, as we have preferred, to accompanying somatic disease. On the other hand, the 2 cases with hypogenitalism gave some ground for the conjecture that there might be a relation between the psychosis and the gonadal impairment found at autopsy. The group of 7 cases about to be discussed may, accordingly, serve to throw some light on the character of this relationship if such exists. For five of them were within the age limits 59 to 75, with duration of psychosis from 23 to 36 years; and should these five cases, advanced as regards both age and duration of the psychosis, show no marked gonadal degeneration, this conjectural relationship betwen the psychosis and gonadal impairment will have to be considered non-existent.

The five cases in point are: 1151, age 50, duration of psychosis over 29 years; 1197, "over 60," duration over 33 years; 1178, age 65, duration 36 years; 1121, age 72, duration 34 years; and 1226, age 75, duration 23 years. Case 1178 showed no reduction in the number of germinal cells. The other 4 all showed but slight reduction in the number of germinal cells, great numbers of mitotic

figures, and all but 1151 contained numerous spermatozoa. This case (1151) showed but a moderate number of spermatozoa. Thus, no marked damage of the gonads was found in these cases despite the factor of age and the assumed influence of the psychosis. According to Matsomoto's [20] findings, the latter is by far greater than the former. Our findings seemed directly contradictory to those of Matsumoto. Indeed, a comparison of the 5 pairs of dementia præcox testes with those of the senile group, which we considered above (p. 421), makes the dementia præcox testes look curiously young and active, despite the double strain of old age and psychosis upon the *élan vital*. Compare, for example, the tubules shown in Figs. 11 and 12, dementia præcox, with that shown in Fig. 13, senile psychosis; age at death approximately the same.

It is rather interesting to compare the 5 pairs of testes from dementia præcox patients with those from the cases of the cerebral arteriosclerotic group. As will be recalled, the arteriosclerotic group showed a reduction in spermatogenesis and a slight intra-tubular fibrosis in some cases, no reduction of spermatogenesis and no intra-tubular fibrosis in others. We then tentatively suggested that this difference was due to the greater or smaller degree of local severity of the arteriosclerotic process. In 3 of the 4 older dementia præcox cases, where we recorded a slight reduction in the number of germ cells, the small vessels of those testes were also thickened. The vessels were thin in the 4th case, which likewise showed a slight reduction in spermatogenesis. The case with no reduction of spermatogenesis showed a slight vascular thickening. However, the rôle of age and the consequent thickening of the vascular system, as a source of the slight reduction of spermatogenetic activity, cannot be overlooked.

In general, then, our 5 old non-tuberculous, non-fibrous cases of dementia præcox are remarkable for the excellence of preservation of active germinal tissue which they exhibited.

Among our two younger non-fibrous cases, one, 1134, age at death 48, duration 25 years, died of œdema of the lungs complicating a pernicious anæmia. In the germinal tissue the cytoplasm was rather lacy, and in some of the tubules it was filled with a pinkish-staining substance. The germinal cells from a quantitative standpoint were abundant, with dark-staining nuclei and numerous

mitoses. Spermatozoa also were present in great numbers, their nuclei staining dark. The basement membrane was thin. The interstitial gland cells were extraordinarily numerous.

The second case, 1236, age at death 36, duration 8 years, died of a broncho-pneumonia complicating chronic cardiac disease. Here, as in the former case, the cytoplasm of the germinal tissue was lacy, the cell outlines being poorly preserved, but there was none of the swelling with the pinkish substance observed in 1134. The germinal tissue was slightly diminished in quantity, with numerous mitotic figures that stained with great clearness of detail. Spermatozoa were few, those that were present, however, possessing a well staining elongated nucleus. Interstitial gland cells were few. Collections of pale, bluish fluid were observed in several tubules as well as in the extra-tubular tissue, and in the left testis, near the tunic, and surrounding one of the medium sized vessels, was a small mass of lymphoid cells. A pale, similarly-staining serous fluid was found in the lumina of the tubuli recti and the epididymis. It is clear that we are dealing with a moderate degree of inflammatory reaction.

In these two non-fibrous cases, then, we find that one, despite a psychosis of 25 years duration and a pernicious anæmia, gives evidence of active spermatogenesis; while the second, of 8 years duration, with moderate inflammatory changes, shows only moderate reduction in spermatogenetic activity.

In some of the cases we have mentioned in passing the condition of the interstitial gland cells. To consider them now in general for all the dementia præcox cases, we can say that there was no uniformity in their occurrence in respect to number, size, or pigmentation. Very roughly, perhaps, in the older testes there was more pigment in the cells, which were smaller and with darker nuclei, but the appearance of the nuclei depended in part on the intercurrent changes such as we have described. As to the number in which they occurred, the estimation was naturally very subjective and very relative, and we cannot put much weight on it. In 2 cases, however, there was no question of a subjective factor: in case 1158, one of the fibrous cases, no interstitial gland cells were seen on the right side, where the fibrosis and atrophy was most marked; and in case 1134, the whole interstitial tissue was so filled with them that there was no possible doubt that they were more

numerous than usual. Except for these 2 cases, the findings in the dementia præcox group did not differ from those in the other psychiatric groups. Our experience coincides with that of Morse,[9] who concludes that, taking everything into consideration," it would be hypothetical to ascribe any variation which might be found to the dementia præcox *per se*."

In the course of this paper, we have expressed certain doubts as to the justification of Mott's contentions. Our findings seem to have brought out that tuberculosis and intercurrent disease, and particularly the former, are of greater importance in the production of extra-tubular fibrosis with reduction of spermatogenesis than Mott seems to believe. Unlike Mott and his co-workers, we have been unable to discover that the duration of the psychosis was proportional to the degree of histological change observed in the testes. Indeed, our findings seem to point to the contrary. It was in the younger cases of shorter duration that happened to succumb to tuberculosis, that spermatogenetic activity was markedly reduced, while in the older cases, which on the whole had escaped tuberculosis, there was more active spermatogenesis. Mott's "third stage of regressive atrophy," which he assumes to represent the most pronounced expression of the enfeeblement of the vital impulse, would for us, then, represent the probable result of tuberculosis or some other material agent of this kind. One further point requires mention in this connection; namely, that the London investigators were not working with specially selected material from which tuberculosis or other complicating diseases had been eliminated. For, in Mott's 1919 paper[4] we find no reference to his having made a special selection. Of 22 cases of dementia præcox he found only 3 in his "first stage" of regressive atrophy. He does not tell how the remaining 19 were grouped, nor does he state which of the cases were affected by tuberculosis or other important complications. Matsumoto[20] does mention tuberculosis and dysentery as diseases to which "these patients frequently succumb," but the 20 cases of dementia præcox which he reports are not analyzed individually. However, he does state that most of the cases were in the "third stage of regressive atrophy."

In the paper written by Mott with Prados y Such,[8] however, 27 dementia præcox cases are tabulated; 1 in the "first stage of regressive atrophy," 2 in the "early second stage," while 9 are in

the "late second stage," and 15 in the "third stage." According to the authors, the 15 third stage cases are characterized by "no spermatogenesis, tubules atrophied, often containing only Sertoli cells, with lipoid granules, thickened basement membrane. No normal Leydig cells—generally increase of fibroblasts." The late second stage shows a "pronounced spermatogenetic regressive atrophy of tubules, thickened basement membrane . . . but still some tubules which show spermatozoa."

The characteristic findings in these two stages are apparently the same as our findings in certain fibrous cases of our series, whether of the dementia præcox group or not—for example, our cases 1161 and 1162 (dementia præcox) 1144 (delirium), 1130 (general paralysis). In Prados y Such's tabulation, we find that of the 15 third stage cases, 9 showed evidence of tuberculosis, 1 "wasting and exhaustion," 1 "chronic dysentery, broncho-pneumonia," 2 others died from "exhaustion," and 1 from "dysentery." In his "late second stage" group of 9 cases, 3 were tuberculous and 2 had dysentery, the other 4 dying of lobar or lobular pneumonia. We are impressed by the frequency of what was called "dysentery" in these cases and by the absence of tuberculosis of the intestines, so common in ours.

The material tabulated by Prados y Such differed significantly from ours in one respect—the age of the patient at death. The oldest among his 27 cases was 36, while among our 16 cases, 12 were older than this by many years. In fact, it was the presence of active spermatogenesis in testes from patients aged 75, 72, 65 and 59, after 23 to 36 years of mental illness, that led us to doubt the validity of Mott's assumption of an inherent germinal defect leading inevitably to a regressive atrophy of the germinal tissue. On the contrary, our data have led us to believe that in the dementia præcox material the changes in the spermatozoa and the basement membrane do not essentially differ in character from those observed in other psychotic groups of similar age and that they are dependent on adventitious circumstances.

Referring again to Mott's hypothesis that there are certain slight histological changes (nuclear eosinophilia, nuclear irregularity) in early cases that mark the beginnings of a progressively severe regressive atrophy, we wish to bring up for consideration the following points. As seen above, we were unable to corroborate

Mott's assumption of a "third stage of regressive atrophy." If this assumption is untenable, his claim that there is a premonitory early stage leading to this third stage loses in validity. As we have shown, even in cases where the psychosis had lasted from 23 to 36 years, active spermatogenesis seemed almost unimpaired and showed no specific differences when compared with other psychotic groups. Mott's hypothesis thus loses its strongest support.

We shall not go into a detailed consideration of the subtle histologic changes referred to by Mott, because (1) we failed to find nuclear eosinophilia in any cases of our series, and (2) irregularity in shape and size of the nucleus in dementia præcox cases differed little in type or degree from that found in other psychotic groups.

It is of interest to compare our material and findings with those of Lewis.[8] This author, working with 18 catatonic and hebephrenic cases, has reported fibrosis, and degenerative changes in the germinal cells. As in our series of cases, the cases that Lewis describes were not free from complicating disease. Fifty per cent (9 of 18) of the patients died of an active tuberculosis. In the other 9 cases, there was in each instance a toxæmia or an infection. Among these latter it is interesting to note that cases VI, IX, and XIV dying of acute infections, and case XXI with Hirschsprung's disease, showed less fibrosis and more active spermatogenesis than the tuberculous and uræmic cases.

Lewis' findings, then, objectively considered, differ but slightly from our own. The same objection to assuming a relation between the findings and the psychosis as such that applies in our study, also applies in his; namely, that tuberculosis, toxæmias, and infections are not eliminated as causes of the changes. The statement that Lewis' studies have proven that "histopathologic changes in the endocrine glands, particularly in the thyroid, adrenals, and gonads, are as universally present as are the characteristic mental symptoms in the clinical picture of a case," is thus premature, because of total lack of *einwandfrei* material.

It might be objected that because 9 of our 16 cases were diagnosed "paranoid dementia præcox," they were not comparable to Lewis' hebephrenic and catatonic material. To meet this objection, we present the following considerations: Most of our paranoid cases had the same histological findings as those described by Lewis for his hebephrenics and catatonics. Some of our cases which did not

show these findings (Cases 1126 and 1211) were of the "simple" type. Furthermore, it is well known that the rubrics paranoid, catatonic, hebephrenic are much less clearly defined and much less mutually exclusive to a clinician on the wards than they are, for example, to a statistician. Indeed, Lewis' Cases I, II, III, IV, VII, XIII, XIV and XX, were not free from delusions of persecution or similar paranoid features, just as our "paranoid" cases, on the other hand, were not free from hebephrenic and catatonic features. So far as the testes are concerned, then, there seems to be no theoretic or practical need of separating the different schizophrenic groups from one another.

Lewis' case XXII, acute catatonic excitement with *"Hirntod"* would have been excluded from our dementia præcox study because of the strong suspicion that the case may have been a febrile delirium.

Morse[9] in studying the testes of 12 cases of dementia præcox, which she endeavored to control with general hospital cases where the cause of death was similar, could find no regular or unambiguous difference between the psychotic and the non-psychotic cases. The changes which she was able to find seemed to depend on the nature of the terminal disease, the state of nutrition, and "possibly in some instances on whether there is an underlying defect in development which is expressed in feeblemindness, rather than on the duration of the disease." She, too, found tuberculosis an inevitable factor. She could not support Mott's contention that the changes were proportional to the duration of the mental symptoms.

If we are to generalize from our study of the cases of dementia præcox, we may say that on the positive side, there were 2 cases in which there was a real gonadal deficiency, and that these cases showed clinically the well recognized signs of hypogenitalism. Of the other cases, 2 of doubtful diagnosis, and 7 which were clearly dementia præcox, showed definitely the effects of an intercurrent chronic disease, in 7 cases tuberculosis. In the 7 without fibrous changes, 5 were cases which, when their old age is considered, showed remarkably active spermatogenesis and remarkable freedom from fibrous changes. Two younger cases showed, one no reduction of spermatogenetic activity, and the other, a slight reduction along with definite inflammatory changes in the testes themselves.

From these cases we did not feel justified in drawing any conclusions as to what changes were peculiar to dementia præcox, because the changes were not sufficiently different from those in other groups in which similar intercurrent diseases were present.

The similarity of our material to the material of Mott and Lewis led us to the conclusion that so far as the testes are concerned, the theories of these investigators lack substantiating evidence.

In conclusion, we should caution against the inference that we disclaim any relation between dementia præcox and any testicular changes. We merely feel that in our material and in the material of the investigators we have cited no sufficient evidence has been found of the existence of such a relation.

Ovaries (9 unquestioned, one doubtful case).—In 3 of these 10 cases, the ovaries were anatomically senile and did not differ essentially from the rest of the ovaries so classified, except for the presence of a papillary cystadenoma in case 1274. In 5 cases, the ovaries were anatomically middle-aged. Three of these 5 showed patchy fibrosis, in one case associated with a lymphoid exudate; and in one of these 3 a large cholesteatoma replaced the whole right ovary. These 3 patients had died of active tuberculosis. The other 2 middle-aged cases were not tuberculous, and did not show patchy fibrosis. One of them (1131) showed the persistence of large corpora fibrosa referred to above (p. 402). The other, 1136, age 50, was the best preserved of the middle-aged group, and showed one primordial follicle. This was the oldest case with an ovum in the complete series of 43 cases.

The 2 cases in the young group (1207 and 1165) contained active ova. In one of these, case 1207, the case of doubtful diagnosis, 34 years old, there was a relative reduction in the number of ova, patchy fibrosis, and a lymphoid exudate. The ova (12 to 14 per section) showed darkly staining degenerated nuclei. The patient died of an active tuberculosis. In the other case (1165), age 31, there was no fibrosis; and the ovaries were the second most active among our 43 cases. The ova contained healthy looking nuclei, sometimes rich in chromatin, sometimes pale. The patient died of pulmonary tuberculosis.

It would appear from our findings that the 3 senile cases could not be differentiated from cases of the same age in other psychotic

groups; that 4 of the 5 cases with tuberculosis showed a patchy fibrosis, associated with a reduction in ovum development; that ovum production was as active in these cases as in those of other psychotic groups; that the youngest case, in spite of tuberculosis, was the second most active case in the whole series of 43; that no nuclear changes were present specific for dementia præcox.

These 10 cases do not seem to show any features specific for dementia præcox. In conjunction with our other cases, they do show, however, that the patchy fibrosis is not a specific feature of dementia præcox, but occurs in association with tuberculosis, and that this factor must be ruled out before any statement of the relation between ovary and psychosis can be made.

Mott,[8] basing his conclusions on the work of Forster,[16] states in a general way that atrophic changes and fibrous substitution are common in the ovaries of dementia præcox cases, whether these died of tuberculosis or of a more acute disease. "In the dementia præcox cases there is usually no sign of atretic follicles, although there are old corpora albicantia." He believes that this is evidence of germinal defect also manifested by the pale staining of the nuclear chromatin.

Our studies, so far as they go, align us with Morse,[9] whose study of 15 female cases of dementia præcox led her to state that "atrophy, when present, can be accounted for by the somatic diseases from which the patient suffered;" and with Borberg,[10] who found in 10 cases no changes in the ovaries which could not be attributed to senility or complications, especially tuberculosis of the lungs.

Hypophysis (27 unquestioned cases; 3 doubtful cases).—Of the 30 cases, 20 showed fibrosis, 10 did not. The 20 fibrous hypophyses were in 17 cases from patients dying over the age of 45; in 3 from younger individuals. The 10 non-fibrous ones, in contrast to this, were in 3 cases from individuals over 45, in 7 from individuals below this age. The fibrosis, then, seemed in most cases to be a concomitant of advanced age. In the 3 younger fibrous cases, the death was due to an active tuberculosis. One of these hypophyses (case 1236) showed a lymphoid exudate.

Among the 10 non-fibrous cases, 7 had met their death from tuberculosis. The 3 dying of other causes were 2 older cases and one of the younger cases.

The difficulty of determining in this material what changes are peculiar to dementia præcox as such is immediately apparent. Fibrosis is present in most of the older cases. But this is true for other psychotic groups as well. It is found in 3 young cases, but they are tuberculous. In the non-fibrous group, we have only 3 cases in which the changes found might not be attributable to the tuberculous infection.

These 3 cases were No. 1178, age 65; 1226, age 60; and 1129, age 25. The first of these (1178) was a case with a psychosis of 36 years' duration. In the anterior lobe acidophile and basophile cells were in the usual proportion, with no dominance of any one type. They were well preserved, and had nuclei which showed no unusual staining reactions. The cytoplasm of the basophile cells showed vacuoles, in keeping with the age of the subject. In the posterior lobe there was a slight increase in pigment. It is interesting to note that in this case the testes were among those with quite active spermatogenesis. Death was due to broncho-pneumonia complicating cardio-rendal disease.

The second non-fibrous case without tuberculosis, 1226, age 60, of over 30 years' duration, had a large hypophysis, weighing 1.1 grammes. In the anterior lobe was a small "neutrophile," adenoma, which has been described on page 409. There were in this lobe, likewise, small areas of hemorrhage and lymphoid exudate. Both acidophile and basophile cells were swollen, but the nuclei stained as usual, and the cell outlines were well preserved except along the periphery where they rarely are in any case. The posterior lobe showed no change. The patient had shown hypopituitary signs. (See p. 416.) He died of a cerebral hemorrhage.

In the third non-fibrous case without tuberculosis, 1129, age 25, duration 6 months, the hypophysis was characterized by a predominance of basophile cells. The nuclei of the anterior lobe cells showed no unusual staining reaction. The cytoplasm was swollen, the granulations not distinct. In the posterior lobe there was no green pigment; the fibers were swollen, and there was a small amount of pinkish free fluid between them. The condition, then, was one of moderate œdema. Death was due to an acute myocarditis with œdema.

In these cases, then, we are dealing in case 1226 with an anomalous finding so far as the dementia præcox material is con-

cerned; in case 1129, with the effects of a somatic disease; and in case 1178, with changes not incompatible with the advanced age of the patient. We are not justified, we can say then, in referring to these changes as part of "the pathology of the hypophysis in dementia præcox."

Leaving out of consideration for the moment the source of the findings, and the complicating features of age and intercurrent disease, we may note the occurrence in 2 of the 30 cases of acidophilia, and in 3, of basophilia. *Acidophilia* in the anterior lobe was found in case 1131, age 52, and in the doubtful case 1255, age 58; the former died of a myocarditis with œdema, the latter of tuberculosis. Basophilia was found in case 1225, age 63; 1168, age 36; 1161, age 30; 3 cases with active tuberculosis, and in case 1129, described above, without tuberculosis. Nothing unusual was found in respect to the amount of *colloid* present in the anterior lobe; following the same rule as in other groups, there was more colloid in the cases with fibrosis. No evidence of *mitosis* was seen in the cells, though polynuclear cells were not unusual. Nuclear paleness described by Mott and Robertson[8] was not noted in our cases. Nuclei without cell bodies, and with poorly preserved cell bodies, were common, especially near the periphery of the gland; but this was true for most of the 105 hypophyses which we have studied. It is most difficult, moreover, to accept this finding as a "lesion," if it is remembered that when the gland is cut in half before fixation the central parts harden before the cells immediately beneath the capsule have been touched by the fixing reagent.

Mott and Robertson,[8] studying 20 hypophyses from cases of dementia præcox, of which 13 were tuberculous, concluded that the atrophy and slight fibrosis which they noted resembled that seen in cases of advanced tuberculosis without psychosis but nevertheless held that the distinguishing point was a deficiency of nuclear chromatin. This finding we do not corroborate in our material.

Lewis[8] in 22 cases found 4 glands with small anterior lobe cells, 6 more with atrophied cells in part replaced by connective tissue, and 7 with patchy proliferation of the acinal cells, "localized adenomatous responses," with a strong basophilic reaction. Without plates, it is difficult to comprehend just what this latter picture might be; but from Lewis' description, it seems to be a finding that did not occur in our material. Ten of his cases showed a fibrosis

in the posterior lobe. As with the testes, the presence of tuberculosis in half of his cases casts suspicion on the validity of any far-reaching theory based on such findings.

Adrenals (23 undoubted cases, 3 doubtful cases).—As in the other diagnostic groups which we have so far considered, fibrosis was the most common pathological finding, occurring in 12 of the 26 cases. In 10 of these, the age at death was over 50, and along with the fibrosis, there were arteriosclerotic changes of varying degrees of severity. The 2 younger cases of these 12 (1168 and 1160) had both died of tuberculosis, and in the first of these there was a marked lymphocytic exudate in the cortex and medulla.

A significant lymphocytic exudate was found in 7 cases. Four of these, over 60 years of age, had a marked arteriosclerosis. The three younger cases (1207, 1168, 1162) died of very active tuberculosis.

An adenoma of the medulla was found in case 1255, doubtful dementia præcox.

Lipoid was present in all cases but one, though somewhat diminished relatively in the older cases. The case in which no lipoid was discovered was case 1160, death due to tuberculosis.

In case 1226 with an atrophied right testis and feminine hair distribution the adrenals were of unequal weight—20 grammes on the left, 12 grammes on the right side.

Four cases had large adrenals in our sense of the term; 8 (including 1 doubtful case) had small adrenals. Three cases had cortices thicker than 12 mm.; 4 (including two of the doubtful cases) had cortices thinner than 8 mm. The significance of these findings has been discussed above.

In our material we were, then, unable to discover any distinctive features of which we might say unreservedly: these are connected directly with the dementia præcox process. Cancer, tuberculosis, arteriosclerosis, as factors in the production of the changes we discovered were impossible to rule out. In the face of such changes as vascular thickening, lymphocytic exudate, and fibrosis, we could not regard subtle intracellular changes in the same organ as connected causally with the dementia præcox process.

Mott and Hutton[7] have recognized the difficulty of ruling out tuberculosis in particular, as a source of adrenal complications. To control their study of 26 cases of dementia præcox, they used the adrenals of 12 non-psychotic cases of tuberculosis. They do not

give the number of dementia præcox cases dying of this disease, although by inference it was present in many of them. Their conclusions, therefore, as to the histological changes in the adrenal in dementia præcox, are based on tuberculous and non-tuberculous cases alike. They found the organs distinctly smaller than normal, lighter in weight, with an essentially normal cortex. In the medulla, they found a varying fibrosis hyperplasia, and usually an extremely narrow medulla as a whole. The medullary cells they found smaller than normal, with relatively small, pale nuclei, deficient in chromatin, and a large proportion of nuclei with no cytoplasm, the ratio of each nucleus seen to the number of cells present being 6.37, as compared to a normal ratio of 1.94.

In our material, no special paleness or smallness of the nucleus could be made out. In no case could we say that no medulla was present, and although we did not use Mott and Hutton's method of reconstruction by means of an Edinger apparatus, we noted no outstanding difference in the size of the medulla of our dementia præcox cases when they were compared with other medullas in our series. We made no attempt to count the number of nuclei and cell bodies seen in the medulla. With the well known difficulties involved in attaining a perfect fixation of the medulla, the frequency of hemorrhage, splitting and fraying in this region, it did not seem to us that the cytoplasm as seen in our sections could give an idea of the state of affairs that had obtained before the death of the patient. In fact, any statement as to the fine structure of nucleus or cell body in this region must be very tentative. As our studies were largely made on paraffin embedded material, they are perhaps not comparable with those of Mott and Hutton, who made use of frozen sections entirely.

Lewis,[8] in his study of 22 cases of dementia præcox, lays more stress on alterations in the cortex. These are aplastic, degenerative, and sclerotic changes. It is not a negligible fact that in 11 of these 22 cases death was due to tuberculosis; or that in 2 cases true tubercles were found in the adrenal glands themselves. As we pointed out when discussing Lewis' interpretations of findings in the testes, it is not scientifically sound to draw a correlation between "dementia præcox" and the findings in organs, one-half of whose number were or may have been affected by tuberculosis. Particularly is this true when one of the chief findings is "sclerosis." In

6 cases, Lewis found accessory islands of adrenal tissue attached to the capsule of the gland, a fact to which he tentatively attributes a biological importance, since such accessory adrenals are common in lower forms of animal life. Their occurrence may then represent a biogenetic regression. If this be true, at any rate so far as our material is concerned, it has no importance for the problem of dementia præcox. We found such "accessory adrenal glands" in over half of the cases studied, whatever the psychiatric diagnosis. In contradistinction to Mott and Hutton, Lewis found the medulla affected in only 7 of his 22 cases.

Witte[21] has reported a diminution in the lipoid content of the adrenal cortex in dementia præcox complicated by tuberculosis, acute infections, cirrhosis of the liver and marasmus. He felt it was more marked than in non-psychotic cases with the same somatic diseases, except for tuberculosis, where in both psychotic and non-psychotic cases there was a lipoid reduction of approximately the same degree. The only outstanding case of lipoid reduction in our material was the tuberculous case (1160) which we have mentioned above.

In the study of Fauser and Heddaeus,[22] the changes in the adrenal glands of 7 cases of dementia præcox were in 1 case inflammatory, and in 4 senile, the latter changes consisting in a slight atrophy of the cortex, sometimes a slight atrophy of the medulla, but in 1 case a slight hypertrophy of the medulla. Morse[9] states in summarizing her study of 27 cases that "the lesions in the adrenals were such as are usually found in diseases to which the patients succumbed."

For our own material, we may in summary state that we found no lesions or structural peculiarities which could be ascribed to the dementia præcox process, the lesions found being such as could with greater scientific safety be ascribed to intercurrent disease.

Thyroid (27 unquestioned, 3 doubtful cases).—We had occasion in our general discussion of the thyroid gland to remark on the ubiquity and constancy of fibrous changes. Our dementia præcox material was not exceptional in this regard. Twenty-nine of the 30 cases which we studied showed a greater or less degree of fibrous increase in the inter-alveolar tissue. The one case where there was definitely no fibrous increase was case 1165, age 32, where it may be recalled the ovary was also unusually well preserved. The most marked fibrosis was seen in the older cases. Here it was accom-

panied by or concomitant with sclerotic or degenerative changes in the vessels. In only one case was there a lymphoid exudate—case 1141, age 74, dying of a gangrenous cholecystitis.

In 3 cases (1126, 1226 and 1151) the thyroid gland was large and heavy, the increased weight being due to fibrous and colloid increase, and (in case 1126) to calcifications in the colloid. In case 1226, where the right testis was atrophied and the left adrenal hypertrophied, only a heavy right lobe was found at necropsy examination.

So far as the vesicles themselves were concerned, nothing distinctive was found. In the older glands, degenerative changes in the colloid, "senile" vesicles, and replacement of the vesicle walls by fibrous tissue occurred just as in the glands from patients of the same age in other psychotic groups. In one of these cases (1141, age 74) an exophthalmoid area was found, though the rest of the gland consisted of senile and colloid alveoli. (Figs. 17 and 18.) Among the younger cases, too, there was nothing distinctive. The alveoli were of the ordinary type, in the more fibrous organs the proportion of colloid type alveoli being high. In one of the younger cases (1139, age 37) a tiny nodule made up of cells of the fœtal type was found. (Fig. 19.) Degenerative changes in the vessels and in the fibrous stroma of this case may have been connected with a marked emaciation due to severe tuberculosis.

Degenerative vascular changes were found in two other young cases, 1161, age 30; and 1129, age 25, the former dying of tuberculosis, the latter of lobar pneumonia.

Except for the exophthalmoid area mentioned, we found no signs of marked regenerative efforts on the part of the thyroid tissue, such as are described by Lewis.[8] In this, we agree with Fauser and Heddaeus [11] and with Morse,[9] these investigators reporting in their cases only such changes as might be produced by intercurrent diseases.

That the fibrosis is part of the dementia præcox process we see no reason to believe. Twenty-nine of our 30 cases of dementia præcox showed fibrosis, it is true, but 90 of the 109 cases in our entire series showed the same finding. On statistical grounds alone it is impossible to incriminate dementia præcox as the causal factor.

Paranoic Condition.

There were two male cases in this group, one of them (1259) a true paranoia of the querulant type in Kraepelin's sense. The other (1187) showed a terminal apathy and may have approached the schizophrenic group.

Testes.—In case 1259, the testes showed no reduction in the number of germinal cells, a slight reduction in the number of mitoses and a marked reduction in the number of spermatozoa. In the extra-tubular tissue there was an inflammatory alteration with a lymphoid exudate. The cause of death was lobar pneumonia. In case 1187, there was a marked arteriosclerosis, patchy, extra-tubular fibrosis, a few lymphoid cells, and a slight reduction in the number of germinal cells. Spermatozoa in both cases were few in number, somewhat round, dark, and unequal in size.

Hypophysis.—In case 1259, the blood vessels showed marked thickening, and in one part there was a thrombosis associated with the appearance of scavenger cells. In case 1187, the anterior lobe was basophilic and moderately fibrous.

Adrenals.—In both cases there was a moderate fibrosis. In case 1187, there were in addition a lymphocytic exudate in the cortex and medulla, arteriosclerotic changes, and thrombosis of some of the vessels.

Thyroid.—There was a moderate fibrosis of the thyroid gland in both cases, the vessels being thickened.

No statement of relation between psychiatric grouping and anatomic finding can be made in regard to these two cases.

Manic-Depressive Psychosis.

Three female cases made up this group: (1) case 1174, age 65, death due to gangrene of the lung; (2) case 1140, age 43, death due to acute enteritis; and case 1167, age 27, death by hanging.

Ovaries.—The ovaries of the first case (1174) were of the senile type. In the second case (1140), they were "borderline" between those of the young and the middle-aged group, a few ova with dark staining nuclei persisting. In the young case (1167), ovum production was much reduced, the reduction being associated with a chronic pelvic condition. The ova were sometimes pale,

sometimes dark. In this case, also, there was a large multilocular follicular cyst. There was no feature common to all three cases.

Hypophysis.—There was nothing noteworthy in the gross or histological picture of the hypophysis in these three cases. In the old person (case 1174) there was a moderate fibrosis, and several "transition" cells between the acidophilic and the basophilic were noted. In the youngest case (1167), there was a reduction in the amount of green pigment of the posterior lobe.

Adrenals.—In the older case there was a slight fibrosis. In the other cases no noteworthy change occurred.

Thyroid.—In case 1174 the thyroid was fibrous and showed a lymphoid exudate in the extra-alveolar tissue. In case 1140, there was a moderate arteriosclerosis with some degenerative changes in the alveoli. The gland was heavy, weighing 42.5 grammes, the left lobe being enlarged. In case 1167, the colloid alveoli were large, otherwise there was no alteration.

On the basis of these three cases, no correlation could be established between endocrine anatomy and psychosis.

Involution Melancholia.

Testes (1 case).—The testes of this case, 1206, aged 63, dying of ulcerative endocarditis, showed multiple miliary abscesses, and extra-tubular and intra-tubular fibrosis appropriate to the age of the patient. Tubules not fibrosed showed very active spermatogenesis, and numerous spermatozoa with dark, roundish, occasionally vacuolated heads. These testes resembled the older, better preserved testes of the dementia præcox group and were strikingly superior to those of the senile group.

Ovaries (4 cases.)—In 3 cases, the ovaries were of the usual senile type, one of them showing a hæmorrhagic atretic follicle surrounded by a slight lymphoid exudate. The ovaries of the fourth case (1252) were typical "middle-aged" ovaries.

Hypophysis (6 cases).—The hypophysis of case 1206 showed miliary abscesses; it was acidophile, with numerous transitional cells. The hypophysis of case 1238 showed a syphilitic involvement already discussed under "Cerebral Syphilis." (See Figs. 26 and 27.) The other 4 hypophyses were not unusual; two of them were acidophilic; 3 of them showed fibrous thickening.

Adrenals (6 cases).—Except for miliary abscesses in case 1206, fibrosis in 4 cases, with exudate in cases 1238 (syphilis) and 1222 (ulcerative colitis), nothing distinctive was made out.

Thyroid (6 cases).—Abscesses were found in case 1206. The other 5 cases all showed fibrosis; the syphilitic case (1238), and cases 1252 (tuberculosis) and 1222 (ulcerative colitis), a lymphoid exudate as well. In these two latter cases there was calcification of the colloid and marked vascular thickening as well. In case 1206, a small fœtal adenoma occurred. Otherwise, the alveoli in all these glands were of the senile and colloid types.

The lesions discovered, then, were essentially those of age and complicating pathological conditions.

Epilepsy.

Testes (2 cases).—Both cases were 32 at death. Case 1256, dying of tuberculous pneumonia, was remarkable in that it was the sole tuberculous case in our series without extra-tubular fibrosis. There was, however, a scattered lymphoid exudate in the interstitial tissue. Mitoses and spermatozoa were abundant. The spermatozoa were dark, irregular in shape, not uniform in size. In the other case, 1220, the spermatozoa were dark, fairly regular in shape and uniform in size. The gland was œdematous.

Ovaries (2 cases).—In case 1246, age 49, the ovary was typically middle-aged. In case 1128, age 47, there was a persistence of large corpora fibrosa in the center of the gland such as was seen in case 1131 of the dementia præcox series. In one of the corpora fibrosa was a lymphoid exudate.

Hypophysis (4 cases).—In the young tuberculous case (1256) there was a slight fibrosis and thickening of the blood vessels. In case 1220, there was an œdema of the two lobes, and the anterior lobe was predominantly acidophile. Otherwise, there was nothing remarkable.

Adrenals (4 cases).—Œdema was present here also in case 1220, and the lipoid pigment was practically absent. In case 1246, there was a moderate fibrosis and a lymphoid exudate. The adrenals were large and the right heavier than the left (20 grammes and 15 grammes respectively.

Thyroid (4 cases).—In case 1220, the gland was swollen. In case 1256, there was a marked lymphoid exudate and fibrosis.

In the other 2 cases, there was a moderate fibrosis of the gland, with alveoli varying in size, a large proportion being of the senile type.

We shall attempt no anatomic-nosological correlation from this material.

Delirium.

Testes (1 case).—This patient (1144) died after a psychosis of 5 weeks' duration, of cancer of the pharynx associated with lobar pneumonia. The changes in the testes were striking, marked reduction in spermatogenesis, thick basement membrane, intratubular fibrosis of most of the left testis, and an inflammatory proliferative change in the extra-tubular tissue. Spermatozoa were absent. Compare these findings with those of case 1158, dementia præcox, death due to cancer of the stomach (p. 424). See also Mott[4] and Matsumoto.[39] (Note on p. 424.)

Ovaries (3 cases).—Case 1143 showed an acute oöphoritis, concomitant with an acute peritonitis, the cause of her delirium, and after three weeks, of her death. The patient had male hair distribution. The other 2 cases (1219, alcoholism; 1239, pernicious anæmia) showed nothing unusual.

Hypophysis (3 cases).—Except for a slight fibrous increase in case 1239 and 1144, the anterior lobes showed nothing remarkable. In case 1144 (the cancer case), there was an increase in the green pigment of the posterior lobe; in case 1219, the case of pernicious ænemia, there was an absence of this pigment. In the peritonitis case (1143) the hypophysis weighed 0.9 grammes, but was otherwise not remarkable.

Adrenals (4 cases).—In the cancerous case (1144) an extensive inflammatory lymphoid exudate was present in cortex and medulla, the vascular endothelium was proliferated, and the small vessels thickened. In the other cases there was nothing noteworthy.

Thyroid (4 cases).—All 4 cases showed a fibrosis. It was most marked in the case with acute peritonitis (1143), where there was a moderate arteriosclerosis; and in the case with pernicious anæmia (also affected by tuberculosis), there was an extensive lymphoid exudate as well. The alveoli were of the colloid or senile type.

Pellagra.

There were two female cases in this group; 1180, age 53, and 1153, age 32.

Ovaries.—The ovaries of case 1180 were described above on p. 397, and their premature senility related to a premature menopause at the age of 32. (See p. 416 and Fig. 16). The ovaries of case 1153 were slightly fibrous, with a diminution in ovum production. (See Table 1.)

Hypophysis.—Only that of case 1153 was received. It was not noteworthy.

Adrenals.—In the older case (1180), there was a moderate fibrosis with thickened and degenerated blood vessels. In both cases there was an extensive lymphoid exudate in cortex and medulla.

Thyroid.—In case 1180, there was marked fibrosis and arteriosclerotic changes. In case 1153, a partial thyroidectomy had been performed: there was a moderate fibrous reaction, a lymphoid exudate, and a marked variation in the size and type of the different alveoli, which in some areas were of the exopthalmoid variety.

The physiological-anatomical correlations have already been discussed on page 397. That pellagra played a part in producing the anatomic changes is probable although not certain.

Brain Tumor.

In this group there were 3 male cases. (1) Case 1228, aged 49, had an endothelioma of the frontal lobe. In this case, the hair distribution was of the feminine type. (2) Case 1233, aged 38, showed an endothelioma of the frontal and parietal lobes. (3) Case 1214, aged 40, was clinically a case of pituitary tumor. The brain was not removed at the necropsy; death was due to wide-spread tuberculosis. This case was an example of Fröhlich's syndrome. See p. 416.

Testes.—In case 1228, the testes showed marked degeneration of the germinal tissue associated with extensive extra-tubular fibrosis. Spermatozoa were absent. In 1233, along with slight extra-tubular changes, the basement membrane was slightly thickened, and the germinal cells showed a cloudy swelling, but spermatogenesis was not reduced. The spermatozoa were dark staining,

and as a rule had plump heads. In case 1214 (Fig. 6) the testes were undescended, tiny, weighing 8.1 grammes on the right, and 7.5 on the left side. Histologically only a trace of tubules with undifferentiated cells was to be seen, but the "extra-tubular tissue" was very cellular, with numerous islands of interstitial gland cells, and with an exudate-like proliferation of endothelioid cells.

Hypophysis.—The hypophyses of cases 1228 and 1233 were both above the average in weight, the former weighing 0.9 grammes, the latter 1.3 grammes. The posterior lobe in case 1228 was deficient in green pigment. In case 1233, there was a swelling of the tissues, and an absence of colloid in the anterior lobe. The hypophysis of case 1214 was not removed.

Adrenals.—In case 1233, the adrenals were swollen, and showed a diminution in lipoid pigmentation. In case 1214 (the Fröhlich syndrome), the adrenals were of unequal weight—on the right, 4.7 grammes; on the left, 8.0 grammes. The cortex was thick, and contained nodules of irregularly placed cortical tissue, and an exudate of lymphocytes. This was in all probability related to the generalized tuberculosis which was the cause of death.

Thyroid.—Large degenerating alveoli were found in case 1228. The whole gland was large, weighing 44 grammes. The other 2 cases showed a moderate fibrosis, and case 1233, in addition, was œdematous. Œdema was also noted in the other organs of this case.

In summary, leaving aside the Fröhlich case, which was discussed elsewhere (p. 416), the common finding in the brain tumor group was a large but essentially normal looking hypophysis. In one case (1233), the increase in weight may have been due to an œdema. Under any circumstances, from the findings in two cases alone, no general statement should be made.

Other Organic Brain Diseases.

This heterogeneous group consisted of 7 male cases. Except for tuberculous changes in the organs of case 1221, and 1227, psychoses with tuberculous meningitis, the changes found did not seem to be connected with the organic brain disease.

Testes.—The testes from a case of epidemic encephalitis (1284) showed a marked acute change—cloudy swelling of the germinal

epithelium, pinkish staining of the cytoplasm of this tissue, dark staining of the nuclei. The few spermatozoa seen had dark roundish heads. A terminal pneumonia complicated the case.

In the other 6 cases there was a greater or lesser chronic change as evidenced by extra-tubular fibrosis. The 2 cases with the greatest fibrosis were a case of brain atrophy with hydrocephalus (1181) dying of tuberculosis, and a case of tuberculous meningitis (1227). The germinal cells were reduced in number, spermatozoa few, with dark shrunken heads in both cases.

A case of traumatic psychosis (1243) aged 58, dying of chronic purulent bronchitis, showed a moderate degree of extra-tubular fibrosis with reduction of spermatogenesis. It is illustrated in Fig. 10, to demonstrate the effect of chronic infection on the testis.

A case of Huntington's chorea with cirrhosis of the liver (1182), and a case of psychosis with tuberculous meningitis (1221) also showed a moderate extra-tubular fibrosis. In the latter case, the fibrosis was accompanied by a scattered lymphoid exudate. Spermatozoa in both cases varied in size and shape, the nuclei staining darkly.

The testes from a case of amaurotic idiocy (1289) dying of tuberculosis, were undescended and have been described on page 393.

The findings in this group of testes serve in a way to "control" the findings in other groups. As in the previous groups, tuberculosis and other chronic diseases have produced extra-tubular fibrosis and intra-tubular degenerations. For comparison with the testis from a tuberculous case with dementia præcox (Fig. 2), Fig. 3 shows the testis from the tuberculous case with hydrocephalus and brain atrophy (1181).

Hypophysis.—A slight fibrosis of the hypophysis was present in the case of Huntington's chorea (1182), and in the 4 cases dying of tuberculosis. In one of these latter (1227, tuberculous meningitis) a moderate lymphoid exudate and a proliferation of endothelial tissue was seen in both lobes and in the capsule. The green pigment of the posterior lobe was increased in amount in the Huntington's chorea case, and diminished in the case of epidemic encephalitis (1184).

Adrenals.—In this group there were three cases with large adrenal glands: the case of traumatic psychosis (1243), in which the adrenals were of unequal weight—12 grammes on the right,

and 20 grammes on the left; the case of brain atrophy with hydrocephalus (1181)—adrenal weights 12 and 16 grammes; and the case of epidemic encephalitis—adrenal weights 14 and 12 grammes. In the traumatic case, there was nothing unusual in the histological picture; in the brain atrophy case, the cortex was thick, there was a fibrosis, and a lymphoid exudate (death from tuberculosis); in the epidemic encephalitis case there was nothing remarkable.

A thin cortex occurred in the case of amaurotic idiocy (1280).

A thin cortex with practically no lipoidal pigment was noted in one of the tuberculous meningitis cases (1227). In the other tuberculous meningitis case (1221), there were several miliary tubercles. Fibrosis and lymphoid exudate occurred in the Huntington's chorea case (1182), death from cirrhosis of the liver; and in the brain atrophy case (1181) described above.

Thyroid.—In the case of amaurotic idiocy, the thyroid was not removed. Of the other cases, number 1184, epidemic encephalitis, was the only one that did not show a fibrous change. The others showed this change to a greater or lesser extent, the one most severely affected being the case of brain atrophy with hydrocephalus (1181), dying of a widespread tuberculosis. There was in this case a lymphoid exudate and a proliferation of the endothelial system as well. A slight lymphoid exudate and a moderate endothelial proliferation was also seen in one of the cases of tuberculous meningitis (1221). In these cases the size of the alveoli varied markedly, though the majority were of the colloidal type.

Though this group which we have just described is heterogeneous, it has a certain importance among the groups of the total series, for it serves as a sort of control for the findings in other groups. The testicular findings in particular are here demonstrably the result of tuberculosis and other chronic infections. The outspoken tuberculosis in the adrenal gland in one of the cases must warn us to be conservative in our interpretation of findings of cases affected by tuberculosis where the tuberculosis is not so outspoken. And finally, it is in this group that we find changes identical with those found in the functional groups where a similar complicating acute or chronic infection occurred. We are consequently deterred from attributing such findings as "scleroses" and "fibroses" in manic-depressive and schizophrenic cases to the uncertain factors which determine the psychoses.

Mental Deficiency.

Testes.—In the one male case of this group (1261) there was no reduction in spermatogenetic activity. Spermatozoa were numerous, varying in appearance from tubule to tubule, some having a small, dark, spear-shaped head, others having a larger, more heart-shaped one with pale areas. The cytoplasm showed a slight swelling probably due to a terminal pneumonia.

Ovaries.—In the one female case of the group (1286), aged 30, there was a large follicular cyst on the left side. Otherwise, the ovaries of this case represented the most actively functioning ovaries in our entire series from the standpoint of the production and development of ova. (See Table 1.) The ovum nuclei were usually dark (Fig. 14).

Hypophysis.—In the male case, the hypophysis was moderately fibrous and in neither case was there green pigment in the posterior lobe.

Adrenals.—In both cases the adrenals were slightly fibrous, in the female case with thin adhesions on the capsule. No exudate was noted and no diminution in lipoid.

Thyroid.—In both cases, there was an increase of fibrous tissue, and in the female case (1286) a scattered lymphoid exudate. The alveoli were not unusual.

Psychosis with Psychopathic Personality.

In one case (1176), the hypophysis alone was studied. It was essentially negative. The findings in the other case (1243) were as follows:

Ovaries.—Patchy fibrosis with reduction in ovum production. Pale, sometimes dark ovum nuclei. (See Table 1.)

Hypophysis.—Slight fibrosis.

Adrenals.—No fibrosis.

Thyroid.—Marked fibrosis, lymphoid exudate, large alveoli.

Accident Case.

In this case (1217), a man of 32, death immediately followed a fracture of the skull.

Testes.—The testes showed very active spermatogenesis, numerous mitoses, no fibrosis. The spermatozoa varied markedly in

appearance from tubule to tubule. In some, the heads were elongated; in others plumper or more nearly round, or occasionally spindle-shaped. As a rule they stained darkly, but not infrequently in the part of the head adjoining the "neck" of the spermatozoon there were paler areas. Figs. 1 and 9 are from this case.

Hypophysis.—There was no fibrosis, and the proportion of acidophile and basophile cells was not unusual. Green pigment was present in the posterior lobe.

Adrenals.—No fibrosis. Lymphoid cells seen only in medulla. No lipoid diminution.

Thyroid.—There was a slight fibrous increase in the thyroid connective tissue. The alveoli were somewhat large.

SUMMARY.

The Testes.—Sixty-five pairs of testes, all, save one, from psychotic persons, were studied objectively without previous knowledge of the clinical or necropsy findings. Twenty-four were anatomically senile; 24 middle-aged; 13 young, while 4 were undeveloped. Two types of fibrosis were recognized: (1) *extra-tubular* (34 cases), generally associated with inflammatory processes, in 16 cases with tuberculosis of the other organs, in 3 with lues, and in the other cases with other chronic diseases; (2) *intra-tubular* fibrosis (32 cases), constant in all testes of the anatomically senile group, or associated with extra-tubular fibrosis. Spermatogenesis as gauged by the abundance of germinal cells and their mitotic activity was diminished in the presence of such factors as age, infectious disease, toxæmia, failure of development. Acute changes in the germinal epithelium were associated with terminal conditions. Interstitial gland cells were fewer, smaller, and more pigmented in the older than in the younger cases. One case (dementia præcox) had a remarkably large number of them; another case (dementia præcox) had none in one atrophied testis. In general paralysis (10 cases), 5 cases showed extra-tubular fibrosis; 2 of these (the most severely affected) were from cases with tuberculosis as well. In 2 cases of cerebral syphilis, a similar fibrous inflammatory change was found. The testes in the senile psychosis group (8 cases), when tuberculosis was not present (in 6 cases) showed the maximum of the changes natural to old age: small tubules, extreme reduction in spermatogenesis, thin acellular, extra-tubular tissue, and anuclear

vessels; in the 2 cases with tuberculosis, marked cellular proliferation in the vessels and extra-tubular connective tissue. In the arteriosclerotic group (7 cases), 2 showed patchy, extra-tubular fibrosis in the neighborhood of sclerotic vessels, 1 with tuberculosis showed marked extra-tubular fibrosis, the others only senile changes.

In dementia præcox (16 unquestioned, 2 doubtful cases), extra-tubular fibrosis occurred in 9 cases—7 with tuberculosis, 1 with cancer and a history of gonorrhea, one with the cause undetermined. Of the remaining 9, 2 showed real gonadal insufficiency, anatomically and functionally; 5 (59 to 72 years of age at death) in spite of long duration of psychosis, showed remarkably active spermatogenesis; 1 case (age 48, duration of psychosis 25 years) showed no reduction in spermatogenesis; and 1 case (age 36, duration of psychosis 8 years) showed diminution in spermatogenesis, no fibrosis, but an inflammatory exudate (pneumonia?). In dementia præcox, the duration of the psychosis was found to have no relation to the severity of the changes in the testes, which were more dependent on intercurrent factors. It was shown that Mott and his co-workers as well as Lewis were working with material similar to ours except in point of age, and though our findings to a certain extent were similar to theirs, we could not agree to their interpretations: the findings were not regular, not peculiar to dementia præcox; moreover, these workers did not sufficiently appreciate the rôle of tuberculosis and other chronic disease. The excellent condition of old testes from dementia præcox cases of long standing was a conspicuous fact that could not be accounted for if the theories of the London workers be accepetd. We could not support Mott's observation of minute changes in the spermatozoon head as peculiar to dementia præcox. Lewis' differentiation of the paranoid from the other forms of dementia præcox groups, as regards the testes seems to us untenable. A comparison of our material, with that studied by Morse and others proved corroborative of our conclusions. It seemed that our material, as well as the material of the investigators quoted, did not afford any definite conclusions as to the relation of psychosis and testicular change.

Among the remaining diagnostic groups, one case of pituitary tumor had undescended testes. The cases in these groups, 1 of delirium (due to cancer), 7 cases of miscellaneous organic brain disease, 2 of epilepsy, 1 of involution melancholia, 2 of a paranoic

condition, 1 of mental deficiency, 1 accident case showed changes attributable to intercurrent tuberculosis or other chronic and subchonic diseases comparable in every respect to the changes shown in the preceding groups when these factors were present.

Ovaries.—The ovaries from 43 cases were studied in the same way. These fell into three anatomical age groups: 20 into the senile, 14 into the middle-aged, and 9 into the young group. One case, pellagra, with senile ovaries, was only 53 at death, but had had a premature menopause at 32. Relative reduction in the ovum producing function was found in a variety of diagnostic groups and was considered secondary to complicating disease. Chromatin deficiency as described by Mott for dementia præcox was not limited to any group in our material. Atretic follicles were common and not limited to any group. The fibrous tufts and persistent corpora fibrosa of Poetzl and Wagner were found to be non-specific and without relation to any diagnostic group. Follicular cysts were found in a variety of diagnostic groups. A cholesteatoma and a papillary cystadenoma were found in two different cases of paranoid dementia præcox. The most important pathological finding, a patchy fibrosis with thickening of the blood vessels and, sometimes, a lymphoid exudate, occurred in 14 cases of the series: in 6 cases of general paralysis, in 1 of cerebral syphilis, in 4 of dementia præcox with tuberculosis, in 1 of pellagra, in 1 of manic-depressive psychosis with chronic pelvic disease. This fibrosis seemed to be related to syphilis, tuberculosis, or pelvic disease; its incidence in general paralysis was striking. The possibility that it represents a gonorrhœal oöphoritis is not to be ruled out, but in general paralysis at any rate, the presence of a similar process in internal organs such as the adrenal glands strongly suggests a syphilitic basis. Ovaries from cases of senile psychosis, unlike the testes of the same group, did not show an exaggerated senility. In two cases of this group, in one ovary of each case, an island of interstitial gland cells, closely resembling the cells of the same name in the testes was found in the region of the hilum.

The Thyroid.—This organ was studied in 109 cases. Five types of alveoli were recognized: (1) a "normal" type, (2) a colloid type, (3) an exophthalmoid type, (4) a senile type, and (5) a fœtal type, this latter occurring only in so-called fœtal adenomata. A marked variation in the type of alveoli from section to section,

and even from field to field in the same section, was noted, and a correlation between interalveolar fibrosis and colloid and senile alveoli, irrespective of the source of the fibrosis or the diagnostic grouping of the case. Ninety of the 109 thyroids showed a fibrosis; 70 of these were from cases over 50 years of age; in the 20 young cases, complicating somatic disease (tuberculosis, syphilis, etc.) seemed to be the chief determining factor. Lymphoid exudates were found in 16 cases among the 90 fibrous ones, associated with various somatic diseases in cases with a variety of psychiatric diagnoses. Swelling occurred in 9 cases with different somatic and psychiatric conditions. In 3 cases small areas of exophthalmoid alveoli were discovered: 1 case of senile psychosis, 1 of arteriosclerotic psychoseis, 1 of dementia præcox. One pellagrin with a previous hyperthyroidism showed numerous exophthalmoid alveoli. Two fœtal adenomata were seen, one in a case of dementia præcox, one in a case of involution melancholia. There was no finding which could be considered specifically characteristic of any of the psychiatric groups: the ubiquity of fibrosis could have obscured any such specific characteristic if it was present.

The Hypophysis.—This organ was studied in 105 cases. Large hypophyses were found in 1 case of general paralysis, 1 of dementia præcox, 1 of involution melancholia, 1 of febrile delirium, and 2 cases of brain tumor. One small chromophobe adenoma was found in the case of dementia præcox with large hypophysis; a similar tumor, about which there might be some question of histologic diagnosis was found in a senile case. Both patients were of the hypogenital type. Fluid was found in 4 cases, miliary abscesses in 1 case, thrombosis in 1 case. Unusually marked acidophilia was found in 9 cases, 2 of them paretic cases, and 7 being in advanced years. Unusually marked basophilia was found in 5 cases. There was no correlation between these staining reactions and the psychiatric groupings. Fibrosis occurred in 67 of the 105 glands, in 6 cases being associated with a marked lymphoid exudate. These 6 cases were: 2 cases of general paralysis; 1 of syphilitic meningitis; 1 of tuberculous meningitis; 2 of dementia præcox with tuberculosis. We could, outside of the inflammatory changes in the syphilitic cases, find no correlation between the hypophyseal findings and the psychiatric diagnosis. In our dementia præcox material, we could not corroborate Mott and Robertson's claims of

chromatin deficiency in the anterior lobe cells, or Lewis' claims of "localized adenomatous response."

The Adrenals.—The adrenals were studied in 112 cases. In 73 they had been weighed. The weight seemed to bear no relation to the psychiatric diagnosis. In 7 cases where the weight of the right and left glands differed markedly, there was no correlation of anatomic and psychiatric findings. The cortex was thick in 9 cases, thin in 14, again apparently not correlated with the psychiatric grouping. Fibrosis occurred in 63 of the 112 cases—in 49 of these, the age of death was over 50. Of the 14 fibrous cases where the age at death was below 50, 7 were from cases of general paralysis. In 15 of the fibrous cases, tuberculosis was the cause of death, and in the adrenals of 2 of these cases, miliary tubercles were found. Fibrosis was thus correlated chiefly with syphilis, age and tuberculosis. Lymphocytes were found in 53 of the fibrous cases, and in 15 without fibrosis. They were either part of a true inflammatory process, or served as scavenger cells in old cases with local arteriosclerosis. Lipoid was absent from the cortex in only 3 cases. Its quantitative reduction or increase could not with certainty be established in the other cases. Thrombosis occurred in one case. A small adenoma of the medulla was found in one case (dementia præcox doubtful). In the general paralysis group only was there a probability of the anatomic changes being related to the psychosis. Here, 13 of the 17 cases showed a fibrosis, 12 of these and 1 non-fibrous case an exudate of lymphoid and plasma cells, and changes in the endothelium of the vessels. In no other psychiatric group was there any definite correlation possible. In the case of dementia præcox, it was impossible to follow Lewis in considering patches of fibrosis a specific finding, either in our material or in the material of this investigator. We could not substantiate the views of Mott and Hutton as to a reduction in the volume of the medulla, and the nuclear changes found there, though we recognize that our methods were different than those used by the London workers.

Functional-Anatomical Correlations.—Among the female cases a prematurely senile ovary was correlated with a premature menopause; hyperthyroidism with exophthalmoid areas in the thyroid. For obesity, infantile uteri, and male hair distribution we found no definite anatomic correlates. Among the male cases, we could correlate undeveloped testes with feminine hair distribution in 4

cases, with inequality in adrenal weights in 2 cases, and with large hypophyses in 2 cases. For hypertrichosis we could find no anatomic correlate.

Anatomic-Psychiatric Correlations. These have been stated under the summary of the findings in the various organs. For convenience, they are here briefly repeated: In general paralysis, extra-tubular fibrosis and exudate in the testes dependent on local vascular alterations; patchy fibrosis and exudate in the ovaries; rarely, a lymphoid exudate in the hypophysis; frequently a lymphoid exudate and fibrosis in the adrenals; nothing specific or unique in the thyroid. In the cerebral syphilis group, occasionally changes such as those found in the general paralysis group. In the senile group, an exaggeration of the normal degenerative process of old age in the testes; except for arteriosclerotic changes, no constant finding in the other organs. In the arteriosclerotic psychosis group, the presence of a patchy, extra-tubular fibrosis in the testes seemed dependent on the presence of local arteriosclerosis; no special feature in the other organs; arteriosclerotic changes. In dementia præcox, the lesions described in the endocrine glands were inconstant, and those which were most common (*e. g.*, extra-tubular fibrosis in the testes, patchy fibrosis in the ovaries) were probably due to intercurrent chronic disease. The results of our study have been discussed at length in the summaries of the various organs. In the brain tumor group, large hypophyses seemed to the rule. The other psychiatric groups represented in our material contained too few examples to allow of any anatomic psychiatric correlation. However, certain cases with deliria or other psychoses with organic brain disease served very well to "control" our findings in respect to the effect of chronic disease, especially tuberculosis, on the endocrine organs.

In conclusion, we should like to emphasize that we do not mean to assert the absence of any possible relation between endocrine organs and psychosis in those groups, such as dementia præcox, where our findings were essentially negative. We do, however, feel that there is no evidence in our material of such anatomic psychiatric correlation, and for the dementia præcox group in particular we believe that our material was quite comparable to the material on which several, in our opinion, untenable hypotheses have been based.

It is a pleasure to express my appreciation of the assistance given me by Dr. Kirby, Director of the Psychiatric Institute and his staff. More particularly am I indebted to Dr. Charles B. Dunlap, Chief Associate in Neuropathology, whose valuable counsel has been untiringly available. The microscopic preparations were made under the direction of Miss Lillian A. Garrett, whose assistance I gratefully acknowledge. To the pathologists of the New York State Hospital System, I am under obligation not only for their assiduity in the collection of materials, but also for the good nature shown by them when not infrequently burdened with a long correspondence concerning the individual cases. The micro-photographs were made by Mr. J. Halupka.

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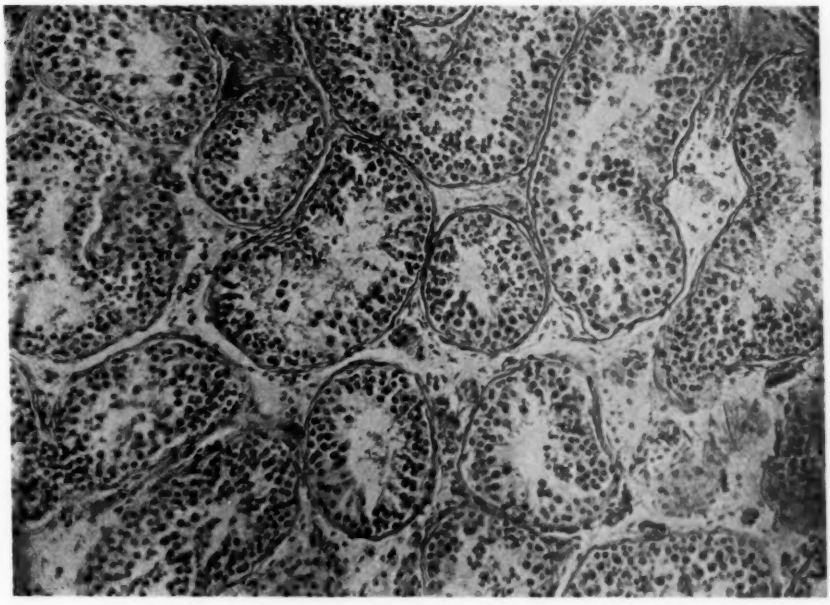

FIG. 1.—Testis from accident case (1217), age 32. Note thin tubule walls, delicate extra-tubular tissue.

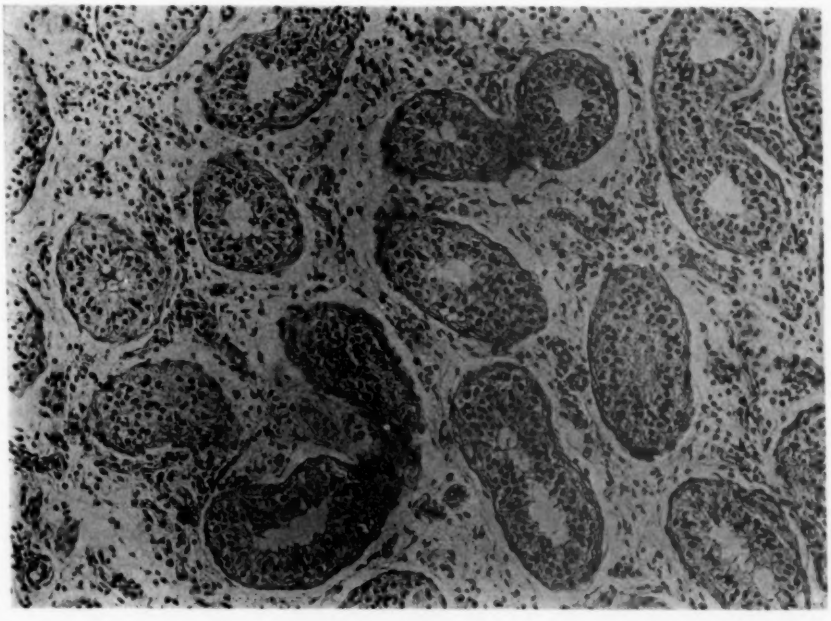

FIG. 2.—Testis from case of dementia præcox (1162), age 29, death due to tuberculosis, to show extra-tubular fibrosis and lymphoid exudate, shrunken tubules, arrested spermatogenesis. Duration of psychosis 6 years. Compare with Figs. 1 and 3.

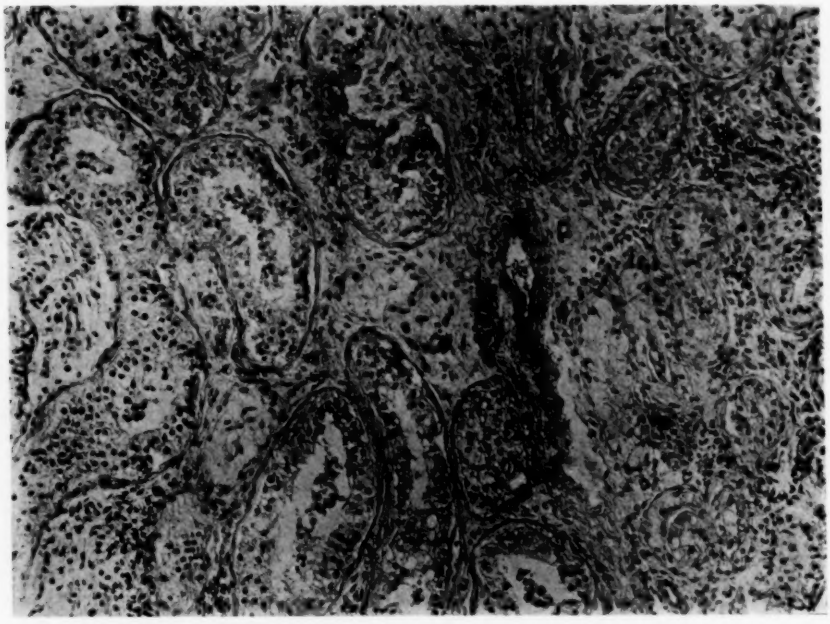

FIG. 3.—Extra-tubular fibrosis and exudate in the testis from a case of hydrocephalus (1181), age 43, death from tuberculosis. For comparison with Fig. 2.

FIG. 4.—Testis from a case of senile psychosis (1148), age 78, to show intra-tubular fibrosis. Between the fibrous tubules note islands of interstitial gland cells.

FIG. 5.—Undeveloped testis, amaurotic idiocy (1280), age 13. Tiny tubules containing almost exclusively undifferentiated cells. Few interstitial gland cells.

FIG. 6.—Undescended testis. Pituitary tumor (clinically), Case 1214, age 40, tuberculosis. No tubules seen. Large patches of interstitial gland cells mixed with inflammatory exudate.

FIG. 7.—Extensive tubular fibrosis in an undescended testis of a case of dementia præcox (1253), age 72. Senile change superimposed on lack of development.

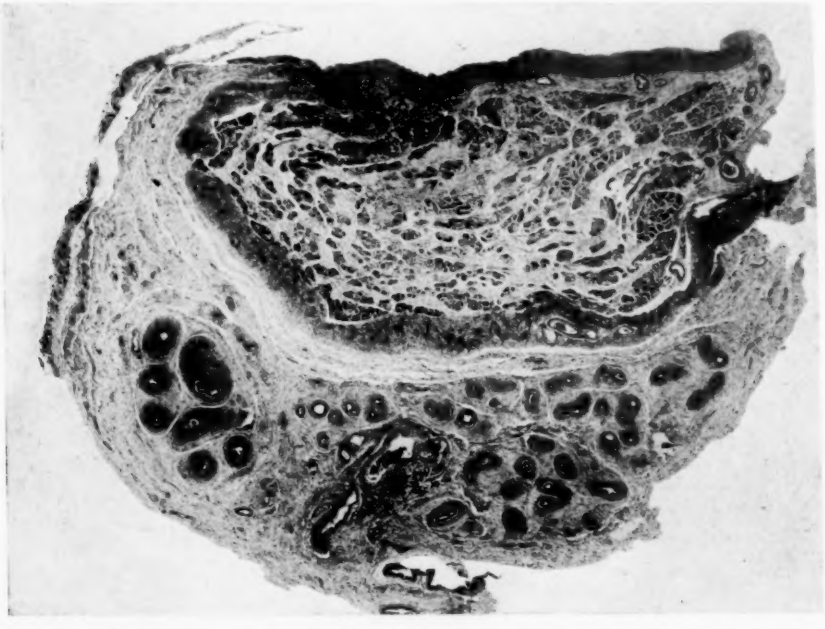

FIG. 8.—Undeveloped testis and epididymis in a case of senile psychosis, age 102. Marked senile changes superimposed on undeveloped testis. Figs. 5, 6, 7 and 8 are of the same magnification.

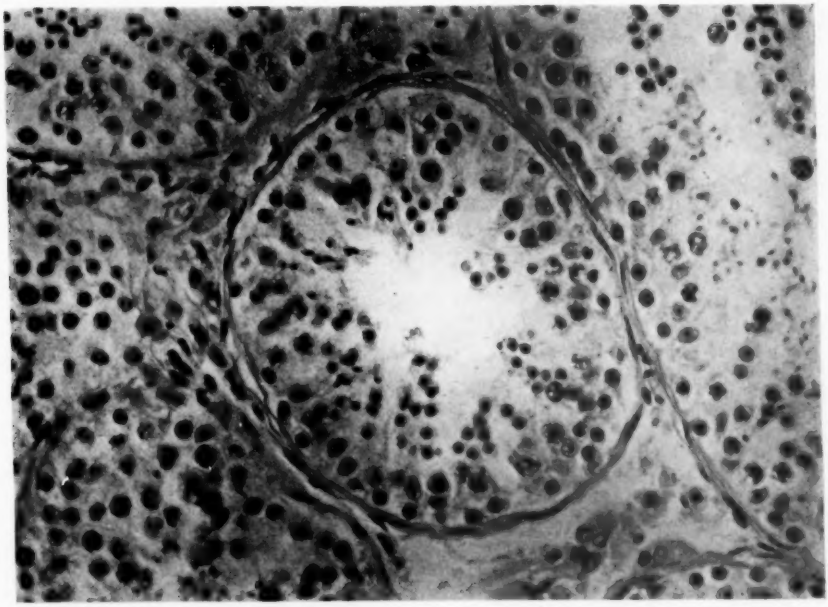

FIG. 9.—Seminiferous tubule from an accident case (1217), age 32. Note number of germinal cells, number of mitoses, thinness of tubule wall. Spermatozoa not so numerous here as in most parts of this testis. The tubule, as well as those shown in the following four figures, was chosen because it was nearly a cross-section. The five figures are all of the same magnification.

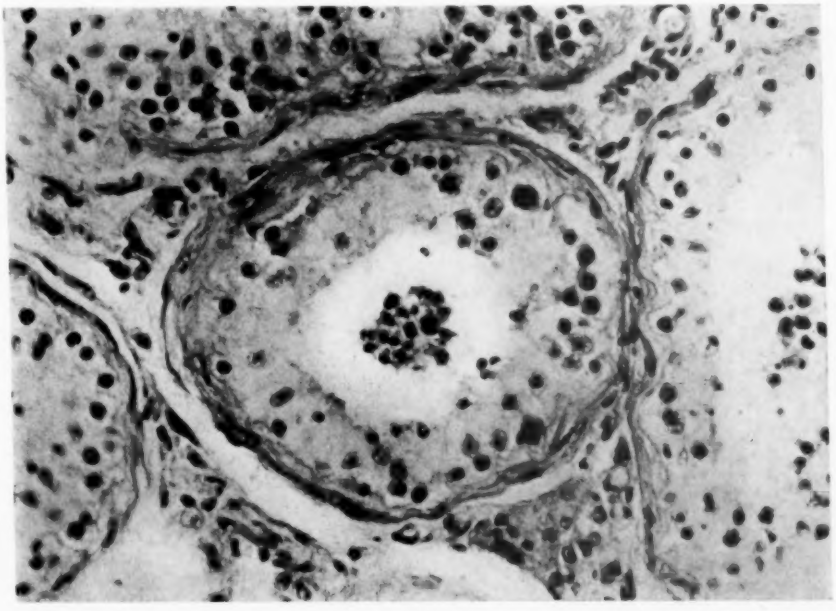

FIG. 10.—Tubule from a case of traumatic psychosis (1243), age 58, death from chronic purulent bronchitis. Note marked diminution in number of germinal cells, absence of mitoses, poor preservation of cytoplasm, slight thickening of tubule wall. To show effect of chronic infection. Compare with Figs. 9, 11, 12 and 13.

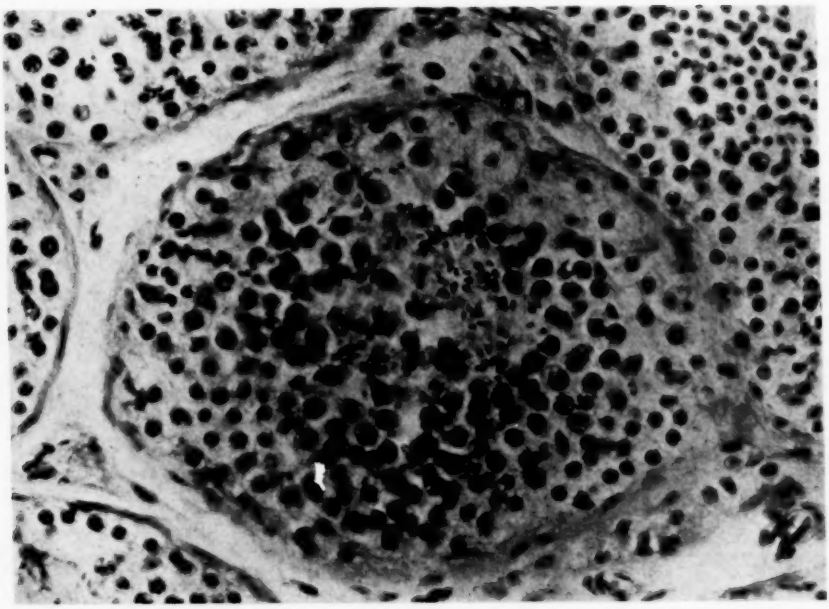

FIG. 11.—Tubule from a case of dementia præcox (11781), age 65, with no tuberculous involvement. Duration of psychosis 36 years. Note large number of germinal cells, mitoses, and spermatozoa, dark nuclear staining. Slightly thickened tubule wall, absence of extra-tubular fibrosis.

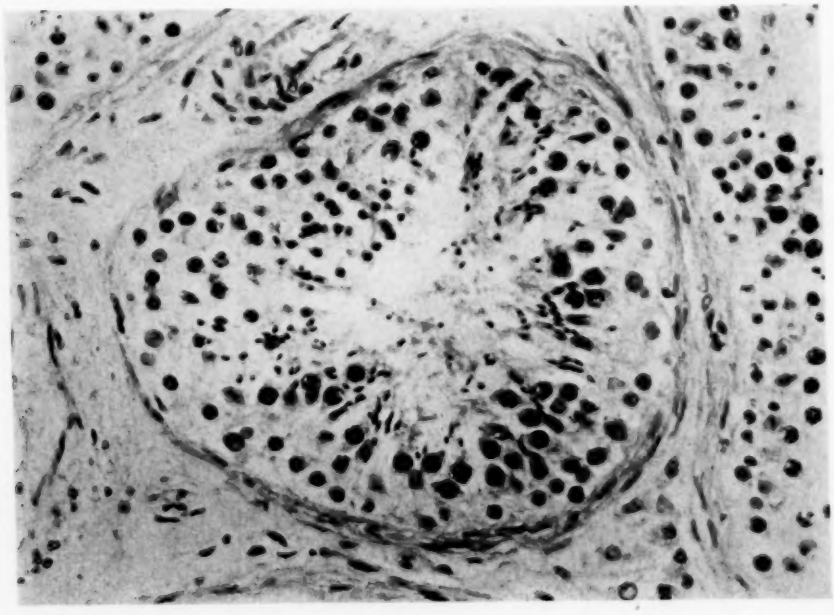

FIG. 12.—Tubule from a case of dementia præcox (1126), age 75, no tuberculosis. Duration of psychosis 23 years. Note numerous germinal cells, mitoses, spermatozoa. Dark nuclear staining. Slightly thickened tubule wall, slightly increased, relatively acellular extra-tubular tissue.

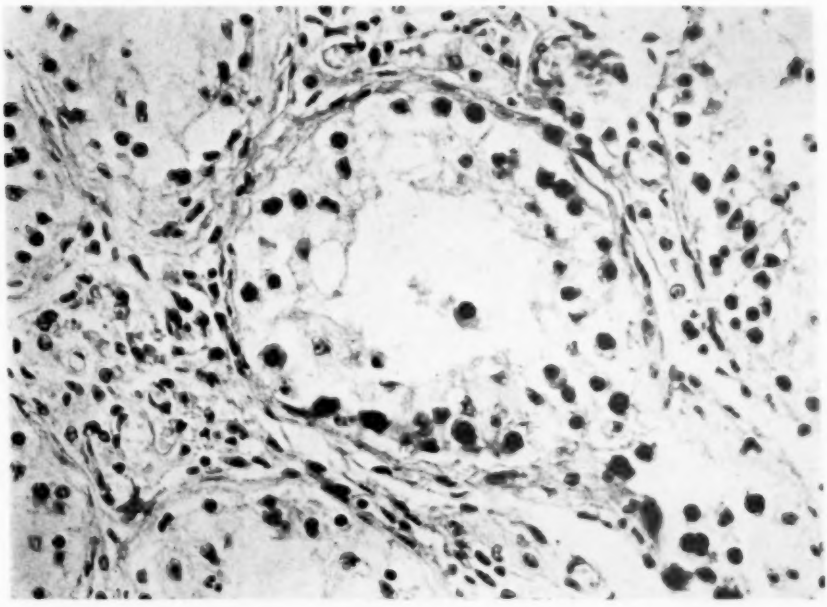

FIG. 13.—Tubule from a case of senile psychosis (1149), age 64. Note marked reduction of germinal cells, absence of mitoses and spermatozoa. Thickened tubule wall. Small size of tubule. Compare with Figs. 11 and 12.

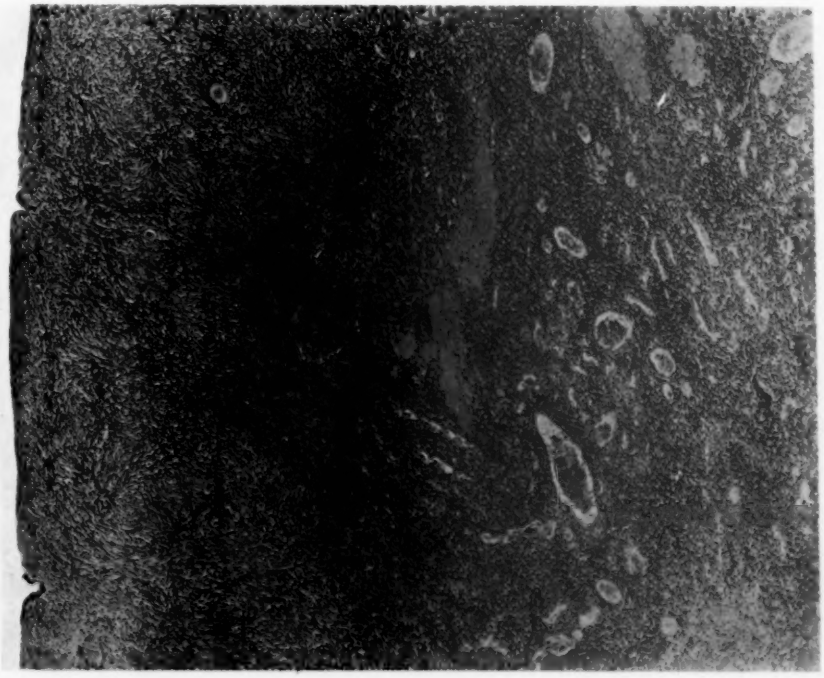

FIG. 14.—Essentially "normal" ovary from a case of mental deficiency (1286), age 30. Note cellularity of stroma, ova.

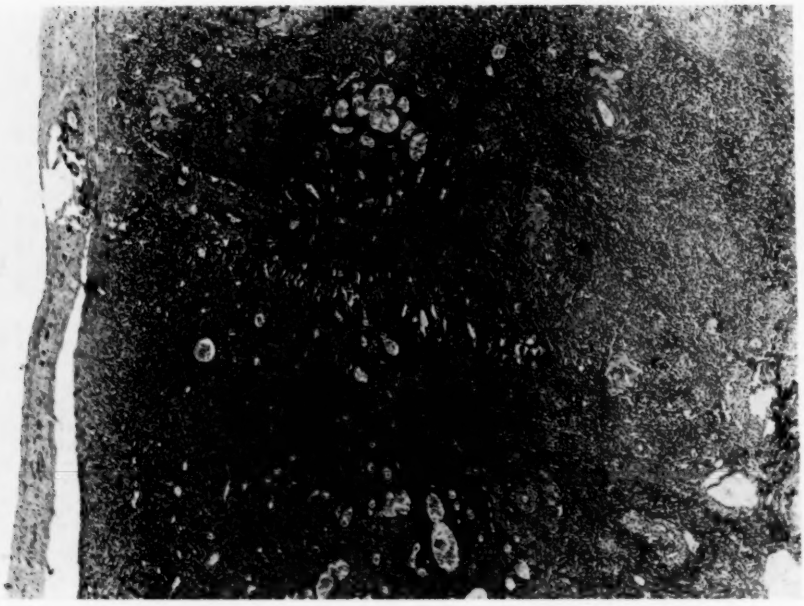

FIG. 15.—Ovary from a case of general paralysis (1137), age 33, to show patchy fibrosis and exudate near the surface. Note the large adhesion.

FIG. 16.—Prematurely senile ovary from a case of pellagra (1180), age 53. Note thin cortex, absence of ova, vascular changes. Menopause at 32.

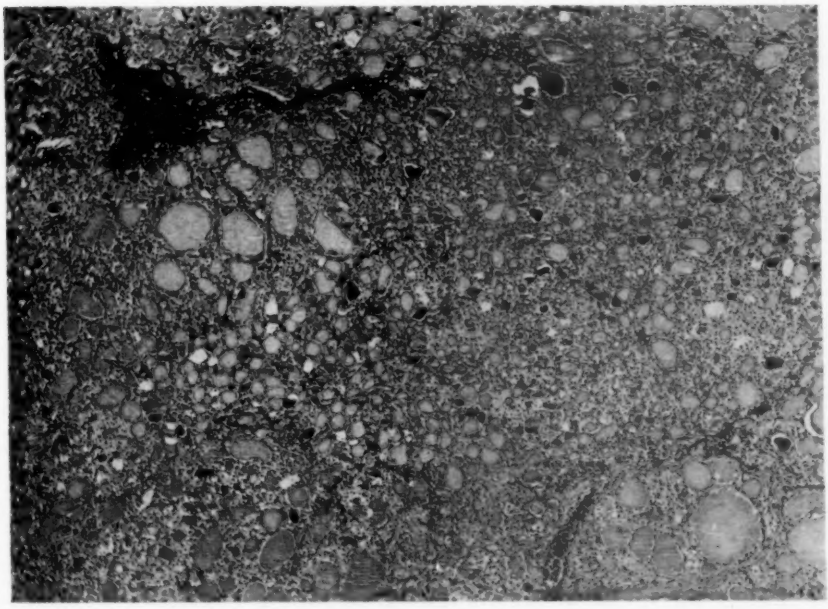

FIG. 17.—Thyroid from a case of dementia præcox (1141), age 74, to show diffuse fibrosis, lymphoid exudate, and variation in size of alveoli. Large colloid alveoli. Small "senile" alveoli.

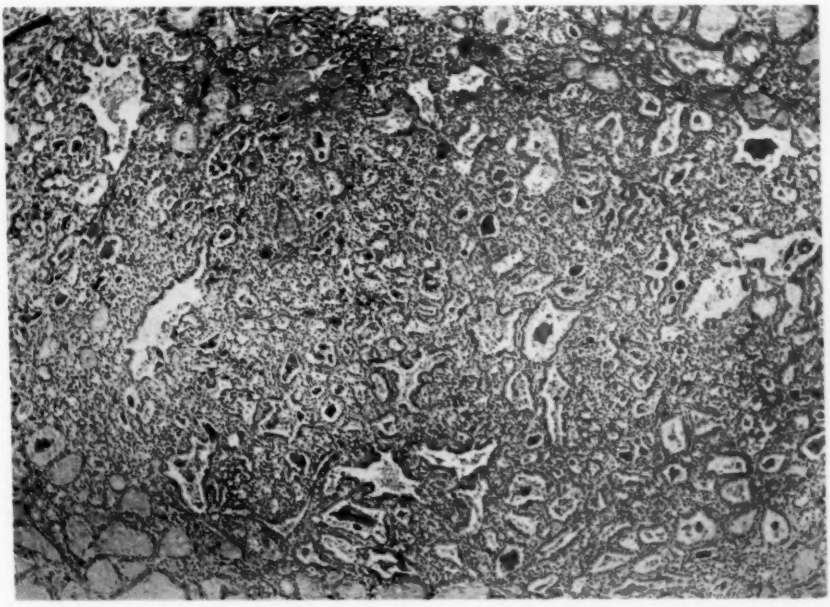

FIG. 18.—Exophthalmoid area from the same section as Fig. 17. Alveoli resembling those seen in exophthalmic goitre. To demonstrate differences in thyroid structure that may occur in the same section.

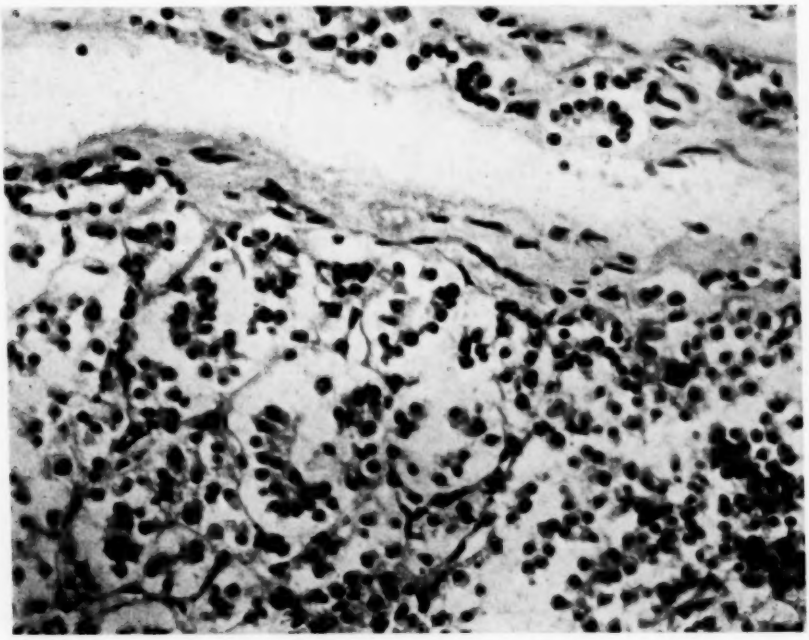

FIG. 19.—Fœtal alveoli from a fœtal adenoma in a case of dementia præcox (1139), age 37. Small cells, small round nuclei. No colloid.

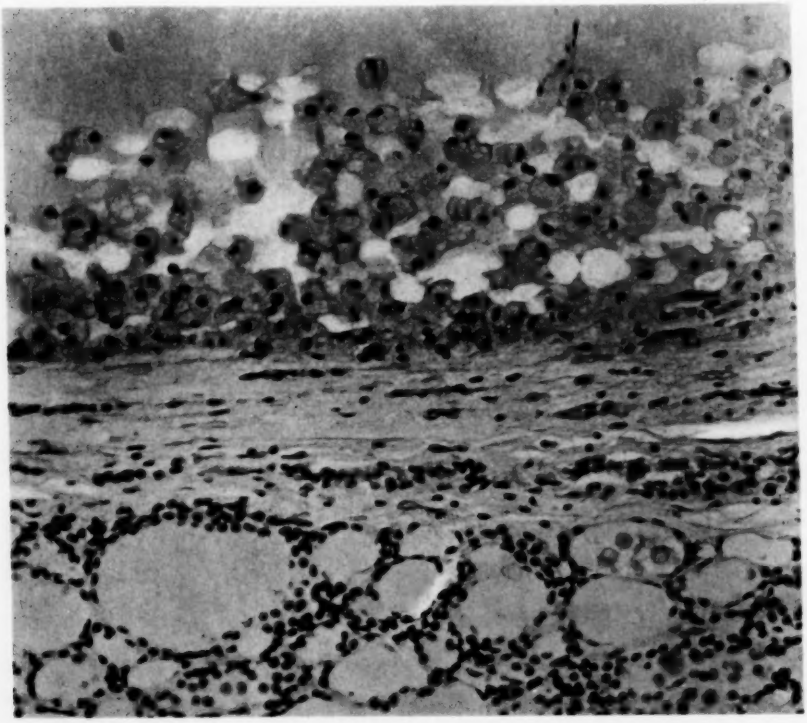

FIG. 20.—Degenerative changes in a large colloid alveolus (1186), age 89, senile psychosis. Gitter-cells of epithelial or mesodermal origin contain lipoid granules.

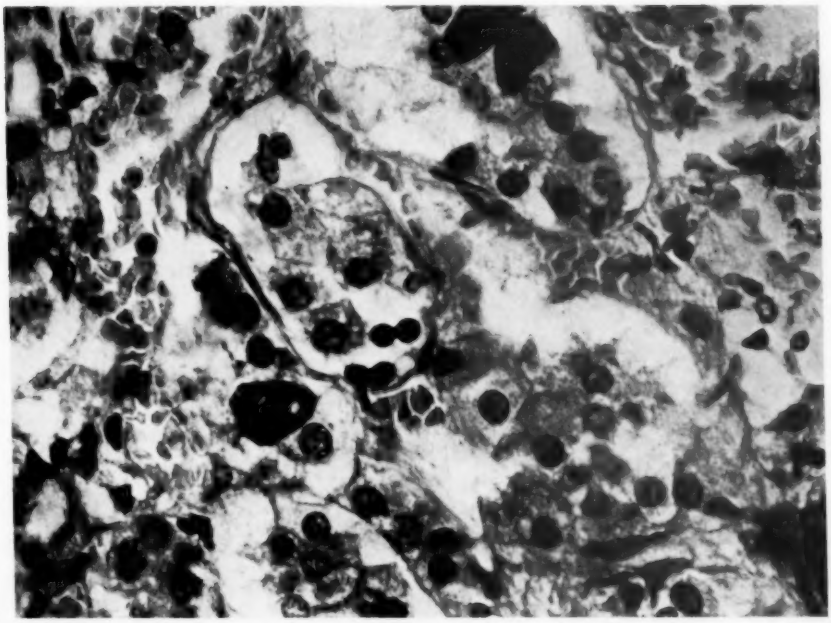

FIG. 21.—Anterior lobe cells, mostly acidophile with a few basophile ones. Hypophysis of a case of dementia præcox (1141), age 74. Note well-stained nuclei.

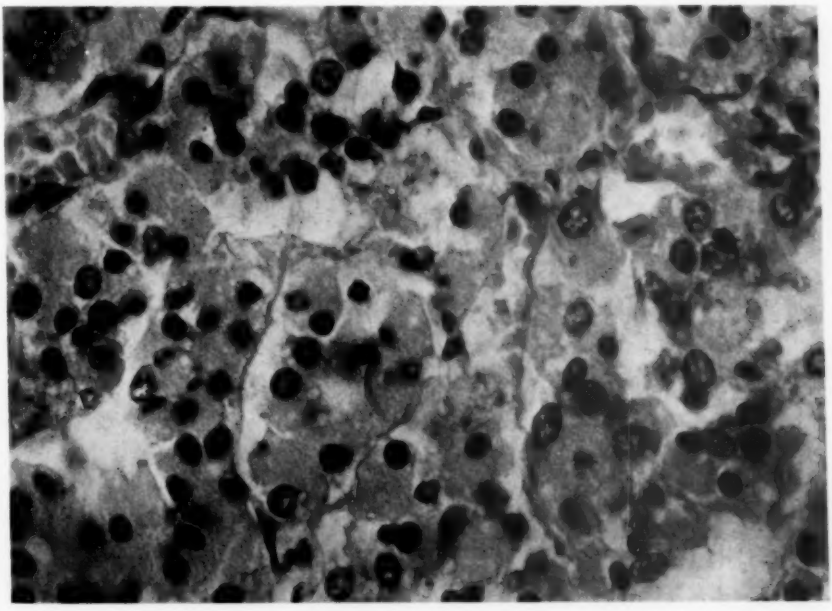

FIG. 22.—From the anterior lobe of the same case, central acidophile region. Note variation in size of nuclei, vacuoles in cytoplasm.

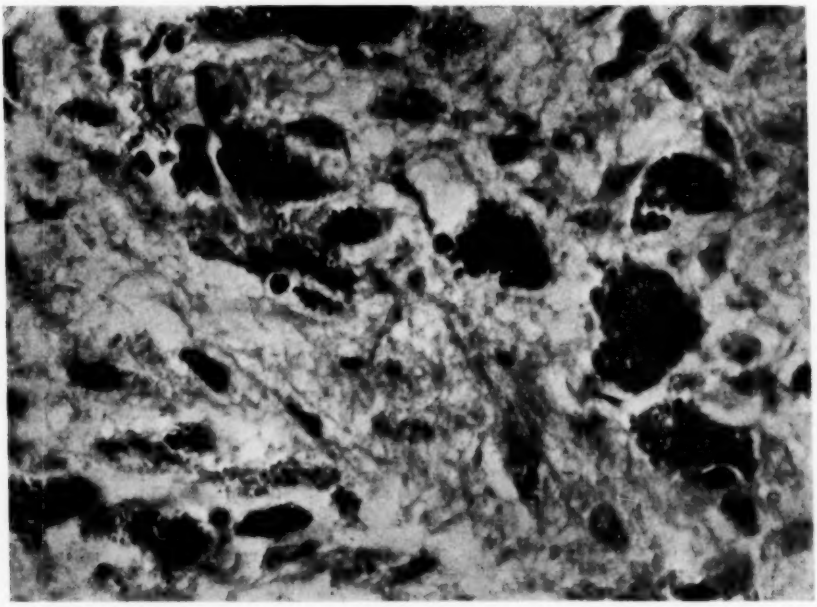

FIG. 23.—Pigment granule clumps in the posterior lobe of the same case; numerous in this and other old cases.

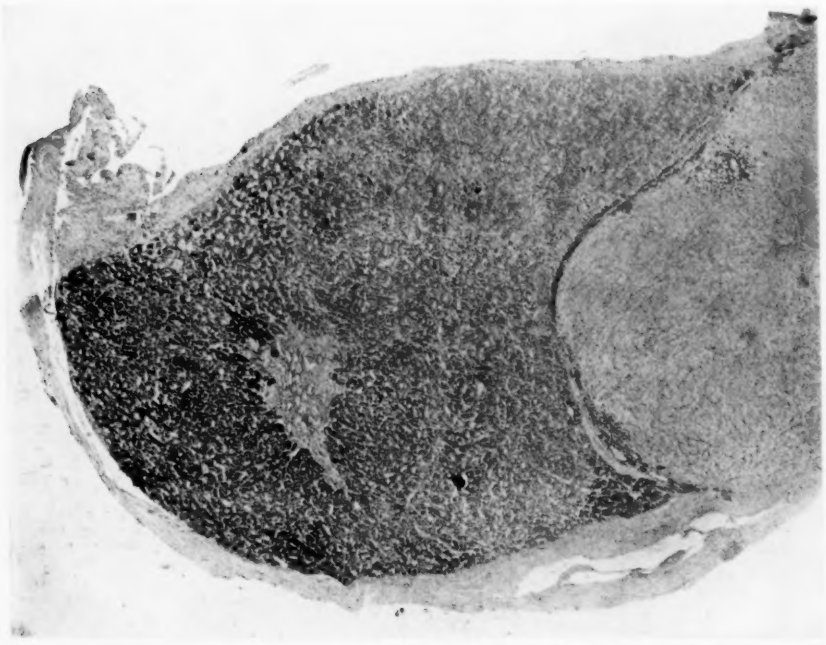

FIG. 24.—Hypophysis from a case of general paralysis (1241). Note thickened cellular capsule of the anterior lobe especially at the front tip.

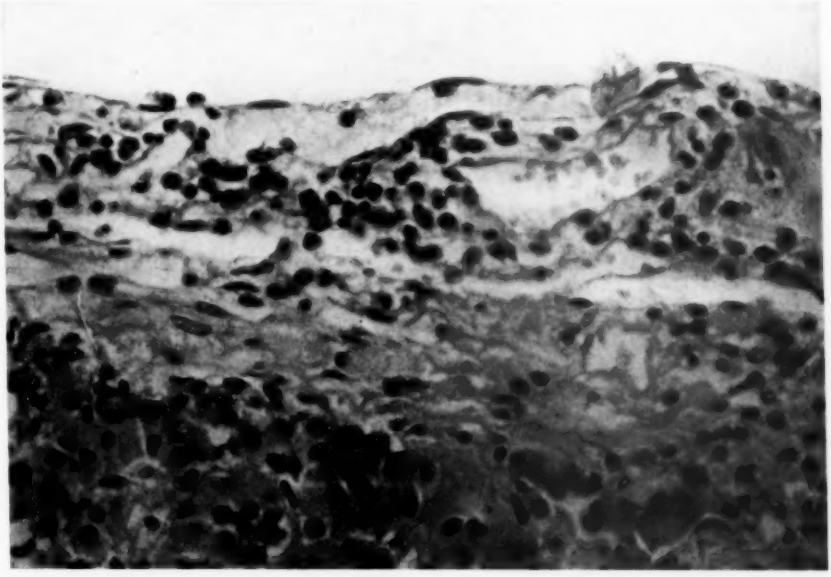

FIG. 25.—High power of the capsule shown in Fig. 24. Note the lyphoid and plasma cell exudate and the endothelial cell activity.

FIG. 26.—Hypophysis from a case of cerebral syphilis (1238). Note the thickened cellular capsule of the anterior lobe, especially in the region of the stalk.

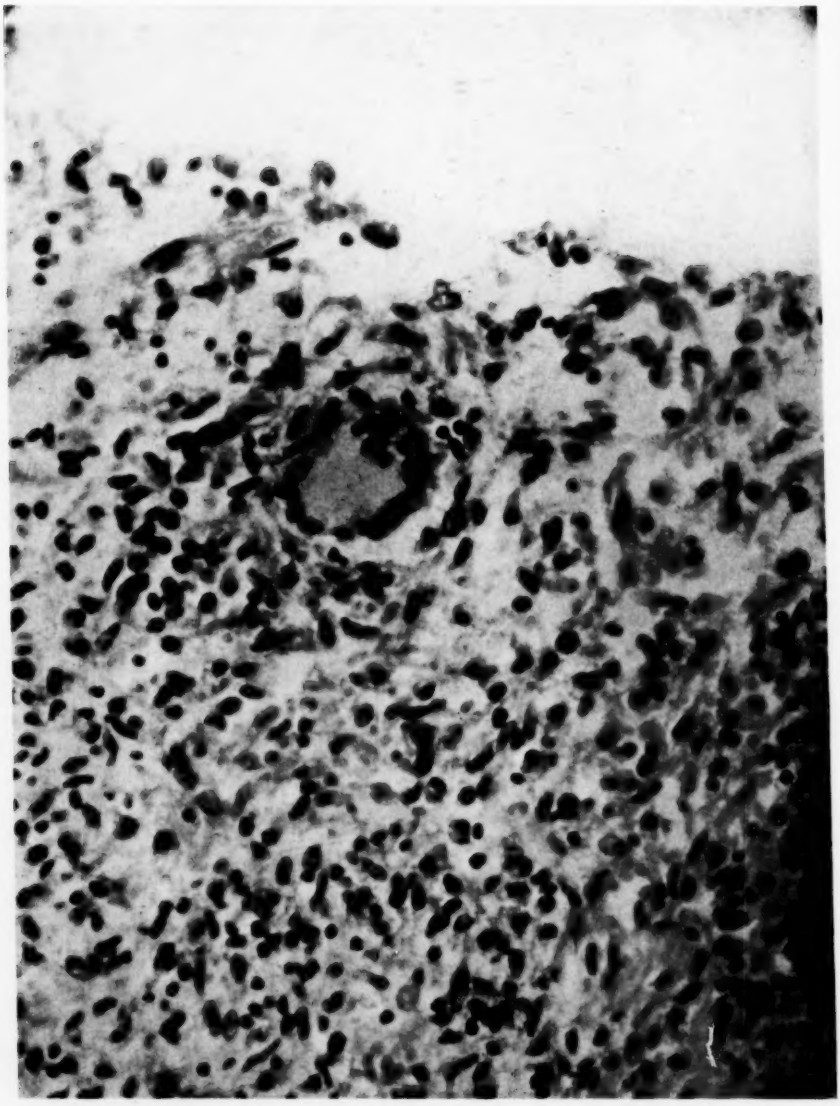

FIG. 27.—Higher magnification of the mass along the stalk region in Fig. 26 showing a lymphoid and plasma cell exudate, endothelioid cells, and a small giant cell.

FIG. 28.—Scarlet R-frozen section preparation of the adrenal in a case of general paralysis (1163) to show the patchy distribution of lipoid in the cortex (seen as black in the photograph). Note the "Collar" of cortical tissue about the central blood vessels.

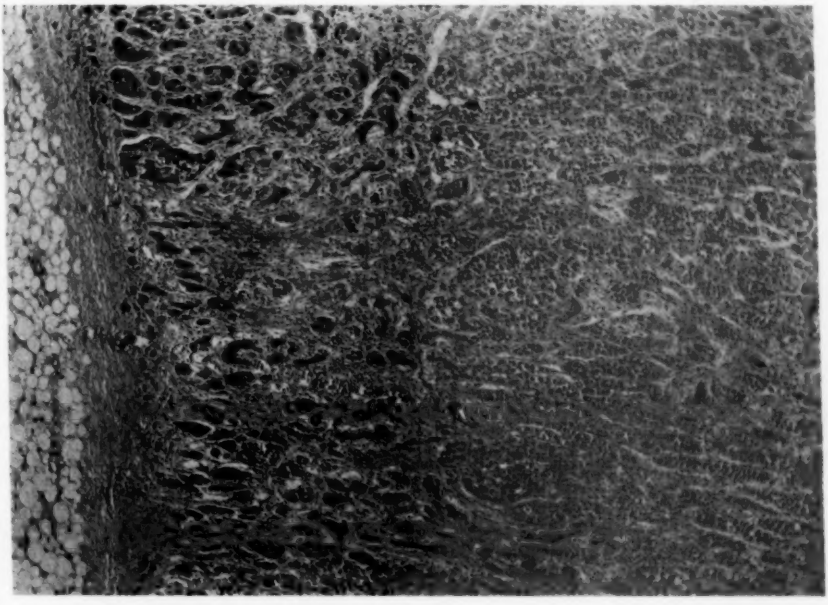

FIG. 29.—Adrenal cortex from a case of general paralysis (1146), Van Gieson stain, showing streaky fibrosis extending in from the capsule. Lymphoid cells in the capsule and fibrous streaks.

UNIV. OF MICH.

THE FUNCTIONING OF A DIVISION OF NEUROPSYCHIATRY IN A GENERAL HOSPITAL.*

By THOS. J. HELDT, M. D.,
Division of Neuropsychiatry, Dept. of Medicine,
Henry Ford Hospital, Detroit, Mich.

August 1, 1923, marks the beginning of our own first direct efforts in developing a division of neuropsychiatry in a general hospital. In this hospital, having a bed capacity of 450, we judged it best to review unostentatiously the hospital's needs and to fit unobtrusively into its existing organization. This, not because neuropsychiatry need offer any apology for its presence in a general hospital, nor for its methods of examination, study, or treatment, but because there is still altogether too much evidence of those traditional barriers that lie in segregation, institutionalization, hoary court procedures, and all that they imply. Assignment to institutional care is still too much a matter of habit and too little a matter of last resort. In the many shifts of responsibility the patient is ever the loser. In speaking of shifts in the responsibility for the welfare of any neuropsychiatric patient *we do not wish* to criticize shifting the patient from one physician to another or from one group of physicians to another—such shifts are usually made to splendid advantage—but *we do wish* to criticize emphatically those shifts of responsibility that can see naught but court commitment and institutional care. Our state institutions are besieged and beleaguered by requests for admissions when their buildings are already crowded, when individualization of their patients is already utterly impossible, and when their staff physicians are so overwhelmed by numbers that they themselves become cynical and pessimistic. Despite many commendable efforts at alteration, the daily grind of the institutional physician is still so drab and dross that superintendents of such hospitals find it virtually impossible to fill their staff vacancies with properly qualified

* Read at the eighty-third annual meeting of The American Psychiatric Association, Cincinnati, Ohio, May 31, June 1, 2, 3, 1927.

candidates. Is there no relief for such state of affairs? We believe that the general hospital should share that burden, and to no small extent.

Any general hospital, worthy of the name, should consider itself able to care for certain types of nervous and mental cases, and should proceed to make provisions to that end. The primary requisite is a neuropsychiatrist, on a full-time basis if possible, otherwise in a consulting and directory capacity. The former is much to be preferred. If the latter, the neuropsychiatrist must give sufficient time to discharge his responsibility properly and the hospital must give him sufficient latitude to make his efforts effective. The limitations of such arrangements lie in the type of cases to be cared for—only borderline cases should be attempted. A general hospital employing a full-time psychiatrist may attempt the management of any and all types of psychiatric patients. Provisions facilitating ease of management will be referred to later. At this point consideration must be given to compliance with all state regulations " for the care of the insane." [1] Every state in the union, in fact each and all United States possessions, has laws or rulings regarding its nervously and mentally handicapped citizens and charges.[2] These rulings must be complied with in spirit if not in letter. Incidentally, there are many letterings sorely in need of alteration, but such change will come only with demand and favorable progress in neuropsychiatric management. In Michigan all hospitals caring for mental cases must be licensed by the state hospital council or commission. These licenses are renewed yearly. We have had no difficulty obtaining such license for the general hospital with which we are associated.

Given, then, a general hospital with a state license and a full-time psychiatrist, we are now ready for the patient. At first we were inclined to limit ourselves to the borderline cases but as the hospital gained in experience we began to discriminate less and less. At present, almost four years after our first venture, we ask no questions and take them as they come, psychoneuroses and psychoses of all types and in all stages of reaction. Yes, we have had experience with some of the violently excitable types and have even tried our hand at some of the long term custodial cases. We now feel confident that any and all types of nervous and mental

cases can be cared for, and quite judiciously, in a general hospital. Whether or not it be the most economical solution is another matter.

Acceptance by the hospital management of our belief that all types of neuropsychiatric patients could be successfully treated in general hospital settings was a matter of slow growth. It was promptly admitted that the psychoneuroses, the toxi-delirioid states, and the neurological disabilities all fell within the scope of the neuropsychiatrist in the general hospital, but care of the so-called insane or near insane was decidedly another matter. the successful management of an active, noisy manic over a period of almost four months brought many tense moments but also the conviction that such cases can be managed in a general hospital. Through this same type of case hydrotherapy also wins a most wholesome respect. If the noisy patient can be accepted then obviously the more quiet one can, whatever his type or condition. Pratt [3] in his splendid presentation of this general subject before The American Psychiatric Association in 1925 expressed a more conservative view. We are thoroughly convinced, however, that with a willing and understanding hospital administration and with appropriate facilities the management of psychotic patients in a general hospital is no longer an experimental undertaking but a very feasible actuality.

Isolation and segregation of the neuropsychiatric patients in the general hospital is a matter deserving of the closest study. It is generally accepted that such constitutes the first step in the proper establishment of a neuropsychiatric division. They are, however, more a matter of expediency than of necessity. They make for ease of management but are compulsory only where facilities for care are inadequate. The usual neuropsychiatric patient may be granted a room or bed amidst the medical or the surgical population of the hospital provided the attending physicians and nurses are sufficiently trained in neuropsychiatric methods to enable them to meet the needs of the case. It is the unusual neuropsychiatric patient that requires isolation and special care and precaution. We especially refer to the symptomatic mental depressions, the noisy, the homicidal, the fault-finding psychopath, and the relentlessly exacting psychasthenic. At first, as already emphasized by Smith [4] our recommendations regarding these types were poorly understood, but with an untimely suicide by jumping from an

upper story window, a stressful night of noise and threats, or a bitter experience with an inconvincible rupophobiac, these cases naturally gravitated to first floor rooms with consequent augmentation of special precautions and other necessary measures. In brief, it is but the creation and the development of a need and then a profiting by the experience of meeting it.

All our efforts at organization in the general hospital have been to develop a division of neuropsychiatry as a subdivision under the department of medicine. Although not without disadvantage there are obviously many advantages not the least of which is the feeling gained by the neuropsychiatric patient, that he is undergoing, at least during his first contacts, medical examination and treatment rather than special mental review. This feature, so aptly stressed by Sandy,[5] serves to remove another of those barriers that prevents the nervous and mental patient from making earlier application for treatment. The stigma of the "nervous breakdown," with or without commitment, still plays far too vivid a part in the life history of that type of patient and in the mind of the lay public, accordingly any measure making for earlier recognition of neuropsychiatric ailments and their earlier treatment is highly important.

It is truly gratifying to find in general hospital experience that an increasing number of patients are coming on the primary complaint of just "nervousness" with the associated desire for an examination. If such patients can be appropriately received, handled, and advised much will be done in shaping individual and public attitude toward psychiatric diagnosis and treatment. In fact, as emphasized by Russell,[6] the public is already in an inquiring and receptive state of mind. We are also called upon more and more frequently, by family members to give advice in regard to management of relatives and friends who clearly are experiencing the incipient stages of some psychosis. When informed that they might well bring such patient to us, we usually receive an answer somewhat as follows: "But, doctor, he won't come"; or, "If we got him here he wouldn't stay, we're afraid he'll have to be locked up and that means we have to go to court and have him committed and we don't want to do that yet." Realizing that postponement of psychiatric diagnosis and care makes for poor prognosis they are firmly advised: If you cannot bring him to us we will go out and bring him in. We will take the responsibility of his staying

here. Provided, that you realize he is sick, that you want our help, and will accept the associated risks and will pledge, even in writing, your assistance and cooperation. On that basis voluntary admissions are the rule, persuasion of circumstance and necessity for detention can always be met temporarily, emergency court orders and commitment proceedings can follow in due time. Whether such orders be for observation or regular institutional care are details that readily adjust themselves. The general hospital psychiatrist should be thoroughly conversant with the court proceedings of his state, county, and city. Acquaintance with the court officials, the public welfare facilities, and other associated state and municipal ways and means helps in the adjustment of an otherwise difficult situation. We do not wish to minimize our difficulties inordinately but it may be reassuring to know that in our experience, legal tangles involving patient and hospital are bridges to be visualized but rarely crossed. Free and easy exchange with the neuropsychiatrists of other hospitals and of the city generally through mutual reviews and consultations is also important in that it fosters necessary cooperation and professional confidence. Parenthetically, it may be remarked here that the report of the special advisers to St. Elizabeth's Hospital is instructive and reassuring.[7] Neglect not the Notes and Comment that immediately follow that report.[8]

In contemplating the establishment and the maintenance of a division of neuropsychiatry in a general hospital we judge that no preconceived plan of any proportion can be set down in a general hospital setting and be expected to function as such. The neuropsychiatrist, of all medical men, knows how important it is to individualize patients and their situations, so in introducing and developing neuropsychiatry in the general hospital, each general hospital setting is different and must be thoroughly individualized and evaluated. Upon the basis of such evaluation must the plan of approach and of development be carried out with anticipation of and provision for flexibility and elasticity of application. In this regard also, in our experience, the range of case, or diversity of reaction-type, whether psychoneurosis or psychosis, cannot be increased any faster than the development of associated understanding and experience on the part of the entire professional and administrative staff of the general hospital. Just as personalization of patient promotes success in treatment and impersonalization of

patient makes for failure just so with the general hospital and neuropsychiatry. Gradual growth and cultivation of the understanding of the professional and the administrative personnel insures sympathetic cooperation and progress—personalization. Sudden installation of a detailed preconceived plan invites quizzical attitude, misunderstanding, and, that same standoffish isolation that "matters of the insane" have been always awarded—impersonalization.

The establishment of a neuropsychiatric in-patient section of a general hospital is very naturally a greater problem than the successful maintenance of a neuropsychiatric out-patient clinic. The latter is now a common service in many general hospitals everywhere, but for almost four years we have maintained both services at the Henry Ford Hospital in Detroit. In-patient, as here used, refers to patients admitted to the hospital for varying periods of time. Out-patients refers to ambulatory patients outside of the hospital reporting periodically for observation, examination, and treatment. Our in-patient service has been conducted in very close association with the other departments and divisions of the hospital, entirely without special structural alteration or arrangement and without locked doors or barred windows. In fact, our windows are of large single plane type without reinforced glass. Handicaps could be mentioned, but we prefer to call attention first to compensating facilities. An adequate force of nurses must be available and a sufficient number of attendants or orderlies must be accessible. Floor physicians or internes must not be too few and must be in closest touch with all case management. Furthermore, supervisory direction by senior physicians with psychiatric training must be at hand at all times or within easy access. In making arrangements for in-patient admissions we have found it therapeutically advantageous to emphasize a four to seven days stay for neurological cases and a minimum observation period of ten days for incipient psychoses. Almost all our hospital rooms are single rooms, each with separate bath and other sick-room facilities. All psychotic patients thus far treated have been managed with or without special nurses in one of these rooms. Physiotherapy is easily accessible on the basement floor, but for patients requiring much tubbing we have found it more convenient from the standpoint of the patient to use large seven-foot portable tubs that may be brought right into the

patient's room and filled from his lavatory. Drug therapy is closely studied and selectively used. Narcotizing drugs are rarely prescribed and then only on special direction of a neuropsychiatrist. The studies of Wright [9] emphasize that probably more attention still should be given to the selective use of drugs in neuropsychiatric cases. It is probably unnecessary to mention that the organic status of the patient is reviewed with much care and that all foci of infection are given attention, even with surgical intervention, as soon as the neuropsychiatric status permits. The frequency and importance of organic disease in nervous and mental cases has been previously remarked upon by myself [10] and by Smith [11] and may well be further stressed by the following brief case citations:

CASE I.—A married man of 65, on previous arrangement with relatives, was brought to the hospital by ambulance. He was actively hallucinated and was energetically reacting to delusions of religious cast. Left alone a few minutes he was found enacting "London bridge," apparently on religious inspiration, by bridging with his naked body the space between the wall of his room and the foot of his bed. For some time he remained refractory and often loudly declamatory—"in the name of the Father, the Son, and the Holy Ghost." On the basis of a senile psychosis with marked agitation and rather poor prognosis, care in a state institution was arranged. Guardianship and commitment through court application were promptly granted, but the family preferred general hospital management. Intensive medical care was given. This included prompt attention to foci of infection—there were marked oral sepsis, chronic tonsils, and faulty renal and intestinal elimination—carefully planned hydrotherapy, and an occasional small dose of paraldehyde. After two months of such care he was paroled to his family and his home. Mild delusional trends persisted for some time, but 18 months after his hospital residence, court release from guardianship was granted. At present, three and one-half years after his discharge from the hospital, he remains well balanced and shows promise of dying of some condition other than attenuation through senile psychosis.

CASE II.—A married woman of 29, in poor health for seven years due to three difficult pregnancies during that time, of seclusive hypokinetic type of personality, was brought into the hospital because of her many ideas of self-reference, delusional trends, and inability to adapt to the demands of her household. After admission her behavior became increasingly more psychotic and for a time she was intractable and uncooperative. Although not clear-cut in reaction-type she was clearly allied to the dementia præcox group. Several serious foci of infection were present—left maxillary sinus contained much pus, marked oral sepsis, very chronic tonsils, definite urinary cystitis, and probable pyelitis. There was practically no elevation of temperature and no noteworthy leucocytosis. Radical antrum operation was carried out, some

extractions were done together with other dental attention, tonsils were removed, but the cystitis would not yield, the pyelitis appeared more definitely and became of menacing degree. After six weeks of intensive care her psychosis had virtually disappeared but because of reduced family finances and the unyielding pyelitis she was transferred as a public charge to the University Hospital at Ann Arbor. After six weeks of general hospital care there she was discharged to her home—her foci of infection under control and her mental status such that she was expected to adjust to home environment. Recent observation shows she is of introverted personality still but free from obvious delusions and able to care for her four children and to carry on her other household duties.

The influence of foci of infection on the appearance and the progress of nervous and mental disease has excited considerable debate—especially the matter of oral sepsis. We should like to divert a little of that attention to inflammatory diseases of the paranasal sinuses and of other body spaces and organs. We have had the privilege of seeing several serious mental states of psychotic degree clear surprisingly on attention to neglected sinus infections.

Case III.—A housewife of 41 was admitted while in the manic phase of a typical manic-depressive psychosis. Under treatment her excitability and distractability soon assumed hypomanic proportions. Her good-natured rebelliousness and refusal of physical examination and other medical attention was exaggerated by her Christian Science faith. Her tonsils were markedly infected but her manic reactions precluded adequate attention. Presently her frequent vocal renditions in high keys fanned her chronic tonsils into a frank tonsillitis of severe degree. To render the symptom picture a little more difficult, erysipelas of the face and neck developed and ran a stormy course. Average rectal temperature ranged between 102° and 106° for six successive days. This period of hyperexia appeared to be without favorable effect upon the course of her psychosis for with the passing of the critical stage of her erysipelas her hypomania reappeared in its former intensity. Two and one-half months after admission her hypomania persisted with minor vacillations but still of such proportion that special day and night nurses were necessary. The acute exacerbation of her tonsils had subsided, accordingly, with the husband's permission but quite contrary to the patient's wishes in the matter, she was anæsthetized in her room, taken to the operating room and deprived of her tonsils. She surprised us by promptly rationalizing to such an extent that it was safe to parole her one week later to her home in charge of a special nurse. Nurse remained in charge for one month. Patient was then sufficiently stable to carry on in her home by herself, her husband, and an only daughter of eleven. She continued a little hyperactive for a time but on reporting to us three months after discharge from the hospital we judged she had regained her average level of reaction which implies usual stability and acceptable behavior.

Whether tonsillectomy had anything to do with the favorable turn in this patient's psychosis is a matter of conjecture. It may have been only co-incidental. Most important is the fact that this type of patient was managed successfully in a general hospital for eleven weeks, through the entire course of her psychosis.

In granting extended care and treatment to the psychotic our two greatest, in fact only two, difficulties have been noise and lack of patient's finances. Both big problems, but we believe both can be, and will be solved sooner or later. If a refractory manic voice his objections too loudly or another become too actively profane or obscene, not only their fellow patients but also the hospital management demand relief. It is right that they should. Usually we succeed in meeting the situation without transferring the patient to a custodial institution, but not always. We aim at 100 per cent and some day we shall win, for already the sound-proof room is a success to no small extent. Of course the necessary doors, windows, and ventilating shaft of such a room are the boll weevils of complete success. Yet, noise deflectors, arrestors, or absorbers are a distinct probability. We have even now more than a gleam of hope in the suggestion of Dr. Owen Copp[12] of Philadelphia. His plan, including double door with air space between and insertion of felt-lined baffles at ceiling and in transom, is logical and worthy of trial.

In considering the matter of finances in its relation to the neuropsychiatric patient, we must be mindful of the fact that such a patient in most cases has been a drain and a strain on the family coffers for months and often years before he came to the hospital. Obviously earlier contact must be made. Many orthopedic cases, chronic cardiorespiratory cases, and not a few medical and surgical cases generally, spend weeks and often months in the hospital and that very willingly and regardless of sacrifice. Why is it not so with the psychiatric cases? It is largely a matter of mental attitude I fear. There are too many physicians, neuropsychiatrists included, who give pessimistic, gloomy, and often utterly hopeless prognoses to and for patients they have observed and examined but little and treated less. Personally, I believe there is just as much money available for the care of nervous and mental cases as there is for other types of illness. Accordingly, we should not be too ready to consign the mentally ill to institutional care alone.

Institutional care is not to be minimized or underrated but at present it is grossly overworked.

Another important consideration in the general hospital management of psychiatric patients is the constancy of the medical attention to be expected from the junior physicians. First and second year medical graduates, to obtain the most from their experience in the hospital, must of necessity rotate to the different departments and divisions. As commonly arranged, surgical or medical internes spend eight months of time in their major service and four months in other departments. When a medical interne's eight months are divided among the different medical services he has only about one month to each service. Such period of time is too short for him to acquire much neuropsychiatric training or to be of much service in rendering assistance in the care and management of neuropsychiatric in-patients. This is especially true when we are forced to admit that medical graduates generally on reporting for their interne year still show little if any understanding of neuropsychiatric problems. Obviously medical schools must include in their curricula more instruction in neuropsychiatry. This is not said disparagingly, for many schools and universities are already directing effort to that end, but the results of such efforts fall far short of the needs. Junior physicians having completed their interne year and giving twelve months to the medical department rotation service or assignment offer a more likely possibility for giving the time necessary to render efficient assistance in a general hospital division of neuropsychiatry. Such help is a part of our present organization.

An adequate nursing force is imperative. Well-trained floor maids, orderlies, and attendants are a necessity. The supervising nurse must have thorough psychiatric training and must be familiar with all the details pertaining to the nursing care of the patients in her charge. She must be qualified to direct and to train the nurses assigned to give her assistance. These thoughts with amplifications have been stressed also by Menninger [23] and by Barham.[24]

Supplying psychiatric training to junior physicians and to nurses of general hospitals as a part of the development of a division of neuropsychiatry in such hospitals, must of necessity be strongly encouraged. In our own experience, especially during the past

four years, we have found junior physicians as a rule eager for such training.

During the past year the giving of a course of 36 lectures on psychiatric nursing before the 70 nurses constituting the graduating class of the Clara Ford Nurses' Home and the Henry Ford Hospital School of Nursing and Hygiene,[16] was a most gratifying opportunity for imparting to receptive nurses the fundamentals of mental nursing. The need is apparent.

The organization and the development of out-patient psychiatric clinics and their relation to general and to special hospitals have been emphasized by Sands,[16] Henry,[17] Oberndorf,[18] Barham,[14] and many others. Plans of hospital arrangement and structure have not lagged behind other developments in neuropsychiatry. Hamilton,[19] Erikson,[20] Bouman,[21] Schaffer.[22] Accordingly space will not be taken here to develop this part of our theme.

We are frequently asked whether we are not taking an undue risk in trying to manage psychotic patients in a general hospital. Special reference is usually made to suicide and elopement. During the three years and ten months since the opening of our division of neuropsychiatry, we have had two suicides in that division while the patient was in the hospital. During the same time there were three suicides among the patient population of the hospital generally. We have had four elopements. Three were promptly found and returned, the fourth was left in his home environment under special precautions. We find the literature just a little meager in reference to collected data on suicides in hospitals. In 1903 Benham[23] made an interesting study of English institutions and recorded 201 suicides in a patient population approximating 788,000, or slightly less than three per 10,000. 135 of these reported suicides were carried out while patient was in an institution. In state institutions generally one to two suicides yearly per institution are to be expected and apparently not in direct reference to numeral differences in patient population. We are not unmindful of United States Public Health Service Reports and the splendid statistical studies of the State of New York, but for our general impression we are indebted to several personal communications: Christian,[24] Bennett,[25] Clark,[26] and Barrett.[27]

TABLE I.

SUICIDES IN PONTIAC STATE HOSPITAL, PONTIAC, MICH., 1878 TO 1925.*

Year.	Suicides.		Average daily hospital pop.	Year.	Suicides.		Average daily hospital pop.
	Male.	Female.			Male.	Female.	
1885†.....	0	1	667	1907.....	0	0	....
1886.....	0	0	...	1908.....	0	0	....
1887.....	0	0	...	1909.....	1	0	1299
1888.....	0	1	736	1910.....	0	0	....
1889.....	0	1	794	1911.....	1	0	1367
1890.....	0	1	951	1912.....	0	0	....
1891.....	0	0	...	1913.....	0	0	....
1892.....	0	0	...	1914.....	1	1	1409
1893.....	1	1	925	1915.....	1	2	1407
1894.....	1	0	955	1916.....	0	0	....
1895.....	0	0	...	1917.....	0	1	1490
1896.....	1	0	1059	1918.....	0	0	....
1897.....	2	0	1050	1919.....	2	0	1472
1898.....	0	1	1057	1920.....	2	0	1490
1899.....	0	0	....	1921.....	1	0	1500
1900.....	1	1	1063	1922.....	1	0	1535
1901.....	1	1	1063	1923.....	2	0	1560
1902.....	1	1	1129	1924.....	3	1	1630
1903.....	0	0	....	1925.....	0	1	1636
1904.....	0	1	1219				
1905.....	1	1	1224	Total 48 Years	27	17	....
1906.....	3	0	1220		44		

* For the data here tabulated we are indebted to Dr. Edmund A. Christian, Superintendent Pontiac State Hospital.

† The hospital was opened for patients in 1878 but no suicides occurred among its patient population until 1885.

In the matter of protective precautions for hospital and patient, especially the latter, we have found it of advantage to have one of the physicians of the staff of the neuropsychiatric division legally deputized. Such physician can then personally serve court orders and citations and do so in a manner much less disturbing than that common to the usual procedure.

The frequency of neuropsychiatric conditions in a general hospital and their relation to other departmental and divisional group-

ings has been very largely a matter of conjecture and of approximation. For that reason we reviewed the case-histories of three groups of patients, successively admitted, but at three different periods in the history of the hospital. A total of 2000 case-records were reviewed. The proportional findings are evident on inspection of Table II. By way of general summary, however, it may be mentioned that from 12 to 20 per cent of all patients admitted to a general hospital will be found to present conditions and problems that are primarily neuropsychiatric regardless of patient's complaint or diagnostic impression on first contact. If mention be made as well of all cases showing secondary and minor disturbances of nervous organization then the percentage promptly rises to 30 per cent and even higher. No detailed search by the neuropsychiatrist is necessary to detect such deviations of function for such deduction is based principally upon the observations and the examinations by physicians without special neurological or psychiatric interest or training. These impressions are further corroborated by reference to Table III. The data there outlined shows that more than 8 per cent of the ambulatory patients voluntarily reporting to the hospital for admission are referred to the division of neuropsychiatry. Such reference is irrespective of later findings and is made by medical personnel who are without special neuropsychiatric training.

The quarterly summary (Table IV) for January, February, and March, 1927, shows in a general way the demands made upon a division of neuropsychiatry in the general hospital. The number of patients seen in the neuropsychiatric out-patient clinic during those three months was 1404. The number of out-patient visits for the same period of time totaled 2154. The number of neuropsychiatric in-patients, that is, the patients admitted to the hospital primarily because of their neuropsychiatric status, was 200. During that same three months, the number of in-patients on neuropsychiatric consultation status, that is, patients under observation, examination, and treatment in other services of the hospital, who we are called by their attending physicians to see in consultation, was 172.

These data and deductions emphasize not only the need and the success of a division of neuropsychiatry in a general hos-

TABLE II.

FREQUENCY OF NEUROPSYCHIATRIC CONDITIONS IN A GENERAL HOSPITAL AND THEIR RELATION TO OTHER DEPARTMENTAL AND DIVISIONAL GROUPINGS.

Department and division.	Nov.-Sept. 1915-16.[a] (500 cases.)		August 1923.[b] (1000 cases.)		January 1926.[c] (500 cases.)	
General Surgery	151		164		54	
E. E. Nose & Throat.			194		60	
Gynecology			65		30	
Urology			21		20	
Orthopedics			36		23	
General Medicine	264		97		46	
Cardio-Respiratory ..			78		40	
Gastro-intestinal			100		45	
Dermatological			43		28	
Metabolic			9		15	
Neuropsychiatric[d]						
Primary	75—15.0%	19.8%	115—11.5%	31.1%	63—12.6%	32.4%
Secondary	12		117		62	
Minor	12		79		37	
Pediatrics	3		43		40	
Obstetrics	2		20		15	
Unclassified[e]	5		15		21	
Totals	500		1000		500	

[a] The Henry Ford Hospital was opened to patients late in 1914. The 500 cases here tabulated represent patients number 510 to 1009. Since the hospital in 1914-15 was not complete in its organization of departmental divisions all cases are grouped under Medicine or Surgery except those grouped in this study as neuropsychiatric. For the review of these cases-records we are indebted to Dr. Clark J. Moloney.

[b] The 1000 cases-records here tabulated were personally reviewed and represent the first 1000 hospital admissions (out-patient and in-patient) after the opening of the Division of Neuropsychiatry, August 1, 1923.

[c] These case-records represent the first 500 hospital admissions after the organization and the opening of the General Admission Clinic. For the review of these cases we are indebted to Mrs. Lottie L. Felkner, psychiatric case-worker.

[d] Primary, as used here, refers to patients whose health problems are predominantly nervous and mental and for whose observation, examination, and treatment the Division of Neuropsychiatry is primarily responsible. Secondary, refers to patients whose ailments lie within the scope of other hospital departments or divisions, but whom we have been called upon to see in consultation or to give other assistance in care and management. Minor, refers to those cases disclosing only minor evidence of neuropsychiatric deviation, and may, or may not, have made contact with the neuropsychiatrist.

[e] Unclassified, includes all instances of emergency admissions or contact where data is insufficient for grouping, also a few instances of lost or unavailable records.

TABLE III.

GROUPING OF PATIENTS BY GENERAL ADMISSION CLINIC.*

Dept. or Div. to which assigned.	1926												Totals.
	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	
General Surgery	67	93	75	78	75	94	82	61	58	77	62	55	877
E. E. Nose & Throat..	71	130	167	142	100	97	101	86	107	94	55	64	1214
Gynecology	95	126	116	87	67	83	78	88	81	81	58	31	990
Urology	28	47	57	60	53	51	47	60	44	50	30	33	560
Orthopedics	43	86	86	83	84	76	83	72	58	73	56	33	833
General Medicine	106	163	169	185	140	109	127	86	142	104	88	70	1489
Cardio-respiratory	57	96	122	95	74	93	95	77	69	66	74	41	959
Gastro-intestinal	101	159	93	185	146	173	152	148	136	118	117	93	1623
Dermatological	40	57	56	67	62	55	56	51	49	44	42	28	600
Metabolic	32	53	47	69	59	47	31	70	43	40	70	37	603
Neuropsychiatric	59	95	116	95	73	91	118	114	93	75	61	44	1034
	7.9%	7.8%	9.5%	7.5%	7.0%	8.6%	10.7%	10.9%	9.5%	7.9%	7.6%	7.5%	8.6%
Pediatrics	45	81	91	91	81	65	78	87	63	70	53	43	848
Obstetrics	6	22	12	17	17	18	18	31	36	35	27	8	247
Unclassified	0	8	10	9	17	9	36	15	11	12	7	10	144
Totals	750	1216	1219	1263	1048	1061	1101	1046	989	945	800	583	12021

* The General Admission Clinic of the Henry Ford Hospital is somewhat akin to reception services of other general hospitals. However, since it deals primarily with ambulatory patients who voluntarily report to the hospital for examination or treatment, it represents only one, although the largest, of its reception services.

TABLE IV.

QUARTERLY SUMMARY—1927.

	January.	February.	March.	Totals.
Number of patients seen in N. P. out-patient division...	427	519	458	1404
Number of out-patient visits..	684	727	743	2154
Number of N. P. in-patients..	63	59	78	200
Number of in-patients on N. P. consultation status...	70	45	57	172

pital, but also the urgent need for the establishment and the development of preventoria for nervous and mental conditions.[28] Paris, in France, and the State of New York have already taken steps to that end.

In conclusion, we wish to emphasize again:

1. The establishment of a neuropsychiatric division in a general hospital should be a matter of gradual growth rather than a sudden installation.

2. All types of neuropsychiatric patients can be managed in a general hospital with adequate facilities and understanding personnel.

3. The development of divisions of neuropsychiatry in general hospitals is a noteworthy step forward in the care of nervous and mental patients and should be further fostered and encouraged.

4. General hospitals by adding a division of neuropsychiatry to their organization will do much to relieve the state institutions.

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DISCUSSION.

Dr. William C. Sandy.—Dr. Heldt has made a very excellent contribution to the cause of mental hygiene in demonstrating that so many varieties of mental patients may be treated under general hospital conditions. I have long felt that the general hospital has a definite responsibility in neuropsychiatric cases but that it is rather limited. A general hospital should receive patients temporarily pending commitment and should also be prepared to study and treat intensively certain selected groups of patients. I have also felt that a general hospital would need more special facilities if mental patients were received in considerable number, but perhaps we are too conservative due to our long training and experience under present conditions.

At any rate, Dr. Heldt has certainly demonstrated that a general hospital can get excellent results with mental patients and that a hospital under those conditions becomes a good training center not only for physicians but also for nurses and other people who should know something more about nervous and mental diseases.

Dr. George K. Pratt.—As I listened to Dr. Heldt's paper I was much impressed with the opportunity that his project at the Henry Ford Hospital affords from a mental hygiene educational point of view. Certainly the clinical work that Dr. Heldt and his colleagues are performing is exceedingly important but I think almost equally important is the opportunity it furnishes for education—education, first of all, of the other members of the medical staff, and education, secondarily, of medical students and of nurses in training.

The stigma that Dr. Heldt mentioned as obtaining for a long time with regard to nervous and mental diseases is slowly but surely diminishing I am certain. I don't know of any better way to expedite the diminution of that stigma than to insert into the system of a general hospital a neuropsychiatric department of this type.

The medical man or the surgical man who has had, during his medical student days, meager opportunity for becoming familiar with nervous and mental diseases, perhaps will look askance at first upon this type of department in a general hospital but when he sees, as the members of the medical and surgical services of the Henry Ford Hospital have seen, the type of service that such a department can offer to them, I am sure they will have their respect for that work raised and any feeling of stigma dispelled.

The opportunity afforded for teaching medical students, of course, is obvious. Dr. Heldt has spoken of the lecture courses given to the nurses in

training, the value of which, likewise, is obvious. Whether or not the average general hospital can afford to maintain a full time psychiatrist in charge of its neuropsychiatric department is, however, problematical. Not all general hospitals are as fortunately situated and equipped as the Henry Ford Hospital is. I think, though, that the general plan which Dr. Heldt has outlined could be set in operation on a part time basis, providing there is, of course, a lessening of the case load carried by the neuropsychiatric department.

I am interested in one or two things I should like Dr. Heldt in his discussion to answer. First of all, I wonder whether or not the courts in Detroit will commit patients directly to the neuropsychiatric department at the Henry Ford Hospital. I would also like to have him say just a word about the character and nature of the standards demanded by the State Hospital Department in Michigan for licensing mental hospitals. Then I am also wondering what he has found to be the average length of stay of patients in his neuropsychiatric department.

Dr. Karl A. Menninger.—I am very glad to comply with Dr. Heldt's request that I discuss this paper because I am having a simultaneous experience both with a psychiatric department in a general hospital and with a private psychiatric hospital of our own, and I feel as if I have a somewhat ambivalent attitude.

I wrote a paper in Modern Hospital some years ago, recommending the same thing Dr. Heldt recommends, but I can't be scientifically honest if I don't say that I am not as strongly in favor of it as I was. I think it has a great many theoretical advantages as Dr. Heldt has outlined and we are not sorry that our new Christ's Hospital in Topeka has an entire floor for a psychiatric department. On the other hand, it does have some disadvantages and I think in the interest of a fair scientific discussion of the matter they ought to be mentioned.

One of them is that it is a little difficult to get the nurses in a general hospital to get into a psychiatric attitude for a little while. At best they are only going to be in the department a few weeks or months and it is awfully hard to get them to have a psychiatric attitude for a few months. Some of you older men know how difficult it is to teach people this in a few years and one certainly doesn't acquire it in a general hospital in a few weeks. I feel that the attitude of the nurse is very important in the treatment of psychiatric patients, and I am not sure it is a good therapeutic measure to treat them by amateur nursing which, in a way, this amounts to.

There is a second thing which is not so advantageous. Try as you may, you can't keep the psychiatric patients oblivious to the fact that there are obstetrical patients and surgical cases all around, and many visitors coming and going. Some of them are very much annoyed and distressed by the whiffs of ether or the sounds of the obstetrical patients' screaming and what-not, which are more disturbing to certain types of mental patients than any of the apparently more spectacular disturbances of some of the other psychiatric

patients whom they learn to understand. The distant muffled sounds; however much soundproofing and isolating you may have, and the constant coming and going in general hospitals is very disturbing.

In the third place, it is very difficult in a general hospital to provide the necessary outdoor life. The patients do not like to go out and be stared at, and the other patients in the hospital do not like to have to see them. The net result is that they are usually denied the very desirable outings each day which they should have.

Finally, there is a serious objection from the financial standpoint. It costs a lot of money in general hospitals to provide the necessary additional personnel and equipment, because, after all, the private psychiatric hospital or sanitarium exists to save people money, *i. e.*, it is the most economical method yet devised for caring for these patients properly. They save money because they distribute over a relatively large number of cases the cost of such necessary therapeutic measures as hydrotherapy, physiotherapy, occupational therapy, and so on. In the general hospital, by the time the patient has paid the laundry and medical charges, the therapy charges, the medicine charges and the nursing charges, the expense is relatively large. That is an important item because all hospitalization is so expensive in these days that the expense of hospitalization of protracted illnesses such as psychiatric cases is an item which we certainly shouldn't overlook.

I grant all of the advantages Dr. Heldt mentioned. The psychiatric department does educate the other men and it does enable us to give hospitalization to some patients by overcoming prejudices where the relatives' prejudices are such that they shun the private sanitarium. On the other hand, these disadvantages do exist and I shall be interested in knowing Dr. Heldt's experiences with them. I enjoyed hearing his comprehensive and well organized paper.

Dr. Lawrence Kolb (Washington, D. C.).—As a measure of the approachment that has occurred between psychiatry and general medicine, it is of interest to note that at the meeting of the American Medical Association in Washington a few weeks ago the section on Practice of Medicine devoted one morning to papers having to do with psychic and emotional factors in physical disease. The clinic which Dr. Heldt has conducted in Detroit is additional evidence of the approach. The useful work that such clinics may do is, I believe, appreciated by psychiatrists, and if in all general hospitals there were some convenient means by which the opinion of neuropsychiatrists could be obtained on obscure cases, the value of this type of assistance would come to be appreciated more and more by general practitioners. Such clinics would clear up many obscure psychoneurotic conditions that are too often mistaken for heart disease, hyperthyroidism, pelvic disease, and the like—and would save patients from useless operations and harmful fixation of symptoms.

Neuropsychiatric clinics would serve another purpose in addition to those that Dr. Heldt has mentioned. The diagnosis neurasthenia or hysteria is still sometimes resorted to as a method of settling difficult cases that more

careful study would establish on a physical basis. In a hospital in which Dr. Heldt had charge of the clinical work I have seen him diagnose a case of brain tumor that had been passed over in a general hospital as functional vertigo. Cases of spondylitis had been diagnosed as neurasthenia merely because the patients had pain in the back and appeared to be neurotic. I could cite other supposedly neurotic cases that were cleared up by careful study, but enough has been said to show the need for clinics conducted by a person alive to the possibility of error in each direction.

There is more reason now than formerly for neuropsychiatric clinics in general hospitals. With the fading of the horror that people used to have of mental hospitals and the growth of a more general appreciation of them, the responsibility for the care of mental patients is being shifted more and more by the general practitioners over to such hospitals. In consequence many patients with recoverable mental conditions of short duration are sent to hospitals for mental disease when they could be successfully treated elsewhere. Clinics for the treatment of such patients in general hospitals would save them and their families from the stigma that contact with mental hospitals causes them to feel. There is nothing that disconcerts some recovered patients so much as the knowledge that it was considered necessary to send them to a hospital for the insane.

The advantage that these clinics would be to psychiatric training of nurses, advocated by this and other associations, is obvious. They would afford a ready means by which nurses could be given several months of practical work with mental patients, and they could not help but learn much about the care of mental patients that would be of value to them and to the general public when they go out into practice.

DR. JOSEPH C. MICHAEL (Minneapolis, Minn.).—Dr. Heldt mentioned the percentages of 12 to 30 of total admissions to the hospital as representing neuropsychiatric cases. In a public general hospital, it was interesting for me to learn what percentage of that should be the expected neuropsychiatric load. The Minneapolis General Hospital with which I am associated has no specialized hospital facilities for taking care of nervous and mental cases. Yet I found in 1924 that a total of 530 out of 10,669 patients were psychiatric cases.

DR. HALL.—May I ask Dr. Heldt how the cost of the maintenance of a patient in the psychiatric division compares with the cost of the care of the patient in a more general medical division? I should like to know specifically, if I may, about what it actually costs in dollars and cents for the maintenance of a patient for a day or a week.

DR. HELDT.—I am truly grateful for the liberal discussion of my paper and for the encouragement received.

Dr. Pratt asked whether cases could be committed directly to the Henry Ford Hospital by court order. With approval of the judge of the court and with the hospital management willing to accept the patient, there appear to be

no very valid reasons why it could not be done. We have received a considerable number of patients committed by court to state institutions who could not be received there at once because of lack of bed capacity. We have asked that review be made of the state's statutes, laws, and regulations to see if any special provision is necessary for direct commitment to our hospital but in the meantime it is accepted that our license to care for mental patients is adequate to cover the point.

Dr. Pratt also asked about special state requirements. We know of none other than the state license already mentioned. If there be others it is very probable that Dr. Barrett, who I see is here, could tell us of them. The state inspector makes two or three visits yearly to us and since he has made no complaints, we judge we are meeting all requirements.

The average length of stay of the neuropsychiatric patient is very varied. The exchange of patients on our service in the general hospital is decidedly rapid and averages about from seven to twelve days. This average even includes a considerable number of long time cases. Some cases are with us from four to six months.

Dr. Menninger made mention of the question of trained nurses. The obtaining of nurses with psychiatric training is not an easy problem. We have met it as follows: Our superintendent of nurses is very understanding of our problems. We have had three well qualified supervising nurses during the four years. The supervising nurses are thoroughly appraised of all of the problems to be met in the division. They are called upon to assume the responsibility of training the nurses working with them. They have met the problems well and although there are many things still to be desired, we are in no sense discouraged.

The control of visitors is frequently a definite issue. We explain to relatives and friends of the patient that we judge it wise to hold visiting at a minimum, giving our reasons. An order is then written in the physician's order book as to just when visitors may be received. The supervising nurse carries out the orders. Occasionally a bold visitor will try to disregard orders. A shift of the patient to another room or some similar alteration is usually sufficient to impress upon such visitor that the orders are to be observed.

The matter of noise is decidedly a handicap. I would like to remark, however, that I have been in a remote part of the hospital and have heard a child in the department of pediatrics create as much commotion as any of my manics have created in another part of the building. Accordingly, it not always a matter of proximity or distance. Quieting noisy patients is very much a matter of detailed individualization. Tolerance and ingenuity must be repeatedly called upon and even then the hospital management is not infrequently inclined to feel the disturbance is still too great, but all in all, the hospital management is very understanding and we continue to take care of a surprising number of disturbed patients, the key note being, the more personal attention one can give his case the better the situation is met.

The patient's finances is naturally always an outstanding factor, and in mentioning them I will imply an answer to Dr. Hall's question. The expense of caring for a psychotic patient in a general hospital is quite inordinate when

compared with state institution figures and we personally feel that such comparison should not be the basis of judgment. Orthopedic patients will go to the expense of hospitalization for weeks and months, and even years. We find that the mental patient and his relatives are quite as willing in most cases to make like sacrifices. They are even willing to meet the expense of special nurses, both day and night, often for long periods. From the standpoint of economy, naturally nothing should be done to drain the patient's resources so that his future care might thus be impaired, but like consideration might be pointed to the long protracted orthopedic or cardiorespiratory cases. The expense of caring for a neuropsychiatric patient in a general hospital, then, is a problem that will undoubtedly need many revisions, but the outstanding feature to me has been that such cases can be successfully treated in a general hospital and that the various draw-backs we have above mentioned are after all minor and will be very successfully met as our experience grows.

NEUROTIC BEHAVIOR AND THE TEACHING OF CONDITIONED REFLEXES.

By A. G. IVANOV-SMOLENSKY, M. D.,
Lecturer on Psychiatry in the Military Medical Academy (Leningrad).

When the lowest and simplest organisms meet some obstacle on their way, they usually manifest a general motor excitation expressed by hyperproduction of motor reaction which is directed to overcome or to get round the obstacle. This some time ago was called the Jennings method of trials and errors. Y. Loeb is of the opinion that such behavior can be noticed in animals when the tropisms are insufficiently strong and definite.

The examination of higher animals with the aid of specially constructed boxes, cages and labyrinths have shown that in these cases the obstacles that occur in the way to food produce different seeking movements, an increased production of motor reactions finally leading to a way out of the difficult position being found and to the animal getting the food. (Thorndike, Yerkes, Watson and others.)

Of late Prof. I. P. Pavlov and his school are working on experimental hindrances, " difficult tasks " for the nervous system of higher animals (dogs).

The cerebral hemispheres, says I. P. Pavlov, are the organs which by means of stimulation and inhibitive cortical processes balances the whole organism with its surroundings amidst their various irritations of a stimulative or inhibitive character.

This bio-adaptation or balancing is attained by forming various positive and negative (inhibitive) conditioned reflexes, chiefly motor reflexes.

If by degrees the experimental tasks are made more difficult, the point may be reached when the bio-adaptive balancing function of the cerebral hemispheres will be insufficient. Prof. I. P. Pavlov and his pupils of late are working on this " insufficiency."

Doubtless this question is also of great importance to neuropathologists and psychiatrists.

The "difficult tasks" which were applied to detect "insufficiencies" of the cerebral adaptation with regard to the outer world were the following:

First in the experimental animals conditioned food reflexes were formed, *i. e.*, the dogs acquired such salivary and positive motor reactions to different stimulations (conditioned signalizing) which were generally seconded by feeding; after that different inhibitive conditioned reflexes were formed.

By repeating the conditioned signal several times without feeding the animal, the conditioned reflex was extinguished (extinguishing inhibition).

One signal was constantly supported by feeding while another which was like the first was left unsupported *f. i.* (1) a circle and an ellipse which only slightly differed from it, (2) two compound stimulations consisting of an equal number of components which in each stimulator were placed in a different order: *a, b, c, d* and *a, c, b, d;* thus the dog was made to distinguish the two signals. *i. e.*, it answered the first by a salivary and motor reflex while the second evidenced an absence of reactions, *i. e.*, an inhibitive effect (differentiating inhibition).

The signal was continued for several minutes and the animal was made to detain the responsive reaction (conditioned reflex) for 3–5 minutes (retarded inhibition). By adding an irritation by means of a strong intermittent current to the feeding, the dog was forced to inhibit its defensive reaction (unconditioned reflex) and to replace it by a food reflex, *i. e.*, the intermittent current was turned into a conditioned signal for feeding (Jerofeeva, Shenger-Krestovnikova, Petrova, Rasenkov, Kreps, Ivanov-Smolensky, and others).

It appeared that the complicating of the inhibitive tasks and the increasing of the quantity of inhibitive conditioned reflexes lead to the overburdening of the cerebral cortex by inhibition and the animals were turned into a singular pathological state.

The cerebral hemispheres of the dog being excited by the conditioned food center (state of hunger) and by the conditioned stimulations signalizing food, encountered a great number of inhibiting signals and proved to be unable to balance the cortical stimulating and inhibitive processes; this state has been termed "experimental neurosis" (I. P. Pavlov).

In these cases some animals manifested an unusual general motor excitement of a "protesting" character and all positive conditioned reflexes were augmented while all inhibitive reflexes that had been formed disappeared even if they were of a durable character, *i. e.*, in the cortex of the cerebral hemispheres the stimulative process prevailed and the inhibitive process was greatly weakened. This state lasted sometimes for many days and no new inhibitions could be formed during all that time.

In other cases some other features could be noticed: Under the influence of a difficult task the animal manifestly changed its behavior; it grew languid, drowsy, slow; the positive conditioned reflexes either decreased or disappeared entirely; such a state might last for weeks.

Here the cortical balance was disturbed and the inhibitive process was clearly prevalent as compared with the stimulative process. The old conditioned reflexes disappeared and new ones were not formed (could not be formed).

We see that in both cases the work of the cerebral hemispheres which consists in acquiring new conditioned reflexes and in preserving the old ones was vehemently disturbed. The biological equilibrium of the organism with regard to the external world could not be kept any more as the cerebral balance was disturbed either towards inhibition or towards stimulation.

Thus the reflexogeneous (bio-adaptive) function of these cerebral hemispheres was insufficient for the solution of the problems of this experiment.

We can also notice the same changes of the highest nervous function in man's conduct.

The complications in the bio-social medium (war, revolution, calamities of nature, catastrophes, emigration), the hard conditions of professional work, family conflicts—all these are difficult tasks for the nervous system which—as we see in life—frequently lead to an abrupt disturbance of the balance between cerebral stimulation and inhibition. In some cases neuroses develop, characterized by increased irritability and a weakening of the social-ethical inhibitions (unrestraint, irascibility, affectivity, etc.) in others neuroses with a prevalence of depressive symptoms—(languidness, aboulia, slowness) and with an inhibition of bio-adaptation and a number of habitual actions.

It is such reactive states, as being the results of a cerebro-conflict (a conflict in the cortex of the stimulative and inhibitive process that ends in victory of one of them) that we, as it seems, find in cases of the so-called "manic-depressive psychoses."

If the cerebral hemispheres being irritated by some compound unconditioned reflex ("instinct") like the food, sexual or self-defensive etc., reflexes, are met by some inhibitive hindrance that cannot be easily removed, then a strong, well-balanced nervous system overcomes, removes and passes that hindrance and in the end produces an adequate conditioned reaction to the given stimulation of the irritations of the outer world.

If that does not happen, the individual's conduct changes abruptly and there develops a more or less stable condition of a morbidity raised or lowered extensibility of the cortex.

Experiments have shown that when animals are in a state of "experimental neurosis" a curious "paradoxal phase" can be noticed, when strong conditioned stimulations produce a weak reaction while weak ones on the contrary produce a very strong reaction (Rasenkov), or when positive conditioned signals produce a very weak reaction and negative (inhibitive) signals an extremely strong effect (Ivanov-Smolensky).

We frequently find this "paradoxal phase" in neurotics and in these cases mere trifles can produce an inadequately strong reaction; such a strong reaction may also be produced by simple inhibition, by some forbiddance to which the patient will not submit while he submitted to it easily before his illness.

The same can be noticed when the outer world demands the destruction of old and lasting habits (conditioned reflexes) or conditioned inhibitions (*f. i.* social and ethic habits). Here also the stimulative and inhibitive processes collide in the cortex.

In all these cases the term "psychic trauma" is generally used. Very frequently we then have to do with "inhibitive hindrances" which the bio-social medium lays in the way of self-defensive (social self-assertive) and sexual bio-adaptation *i. e.*, the adaptation of the individual.

Thus the pathogeneous cause in these cases lies in the complex situation of the stimulations; this situation acts upon the brain and needs an exact balancing of the cortical stimulation and inhibition.

If such a balancing does not succeed a cerebro-conflict takes place bearing the symptoms of a neurosis in consequence of which an inhibitive spot results in the cortex of the cerebral hemispheres (a dislodged complex).

In this spot there remains, as it were in a bound state, a nervous energy which has not been reacted off adequately and at the proper time, *i. e.*, which has not been utilized at the proper time to remove the causes of the neurosis.

There are cases when the outer world at the same time stimulates to activity and inhibits, while it demands a subtle analysis of the accompanying circumstances stimulating the cortex or inhibiting its activity.

When the outer world raises various and complicated hindrances while some complex inconditioned reflexes (instincts) stimulate the cerebral hemispheres demanding the overcoming or the getting round these hindrances a " psychic trauma " may easily occur; the physiological substratum of the latter as we have seen, is the disturbance of the equilibrium between the stimulative and inhibitive processes in the cortex of the cerebral hemispheres.

The lower the ontogenetic adaptability of the nervous system is, the weaker the balancing bio-adaptive reflexogeneous capability of the cerebral hemispheres is, the quicker we can expect the occurrence of a cerebro-conflict and the developement of a neurosis.

Hence it follows that the treatment of a neurotic patient must consist not only in the deliverance of the cortex from inhibitive spots (complexes) which is often tried to be done by means of psycho-analysis, but also in the training of the ontogenetic adaptability of the nervous system, in the training of the reflexogeneous capability of the brain.

Therefore it can be said that:

1. Neurotic conduct is the expression of disturbed equilibrium between cortical stimulative and inhibitive processes: either cerebral stimulation or inhibition predominates.

2. The " psychic trauma " which is generally supposed to be the cause of the development of neuroses, from a physiological point of view is a task which is difficult for the balancing of the stimulative and inhibitive cortical processes (differentiation or integration) which task is offered to the given nervous system by the bio-social medium.

The cerebral hemispheres being stimulated to activity by the lower parts of the nervous system (feeding, defensive, sexual, etc., and other unconditioned centers) at the same time meet intensive hindrances in the bio-social surroundings; thus in the cortex a conflict of the stimulative and the inhibitive processes (cerebro-conflict) takes place which produces an abrupt disturbance of the intracerebral balance and a wide spread irradiation of the stimulation or inhibition (stimulative or inhibitive neurosis).

3. The "dislodged complex" corresponds to the originating in the cortex of an inhibitive place which is the result of an unsuccessful bio-adaptation.

4. The cause of a neurosis is the incongruity between the complicated nature of the surrounding world and the ontogenetic want of adaptability of the given cerebral hemispheres; thus that cause is the weakness of the reflex-producing, *i. e.*, balancing capability which keeps the equilibrium of the individual and the external world by means of cortical excitation and inhibition.

5. The treatment of a neurosis must tend not only to remove the cortical inhibition spots (dislodged complexes) but also to train the reflexogeneous and balancing function of the cortex of the cerebral hemispheres.

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A SIMPLE THERMOTHERAPEUTIC TECHNIC.

With Special Reference to the Fever Treatment of Neuro-Syphilis.

By AARON J. ROSANOFF, M. D., Los Angeles, Cal.

There is considerable clinical and experimental evidence indicating that high degrees of fever are capable of producing harmful effects on the animal organism. Hence, physicians have long been in quest of means for reducing body temperature in fevers.

The encouraging results secured in recent years in parenchymatous neuro-syphilis by means of malarial inoculation and other measures whereby fever has been induced have similarly led to a quest for a method whereby the body temperature may be raised with as much certainty and safety as may be possible.

The methods thus far relied on for reducing body temperature has consisted mainly of the use of antipyretic drugs. However, not infrequently, hydrotherapy has been resorted to, but in rather violent forms, such as cold baths and packs.

The methods for raising body temperature have consisted mainly in inoculations with malaria, relapsing fever, rat-bite fever, injections of dead typhoid bacilli and of foreign proteins.

Whether the indications for lowering or raising the body temperature have always rested on a sound basis or otherwise, it is not the purpose of this paper to discuss. It would seem, however, that if thermotherapy is to be employed at all, it would be preferable to make use of a technic whereby changes in the body temperature might be produced under better controlled conditions, that is to say, under conditions whereby any desired reduction or elevation of temperature might be brought about, either gradually or rapidly, in any degree that may seem safe and necessary, maintained for any length of time that may seem safe and necessary, and returned to normal as promptly as may be desired.

It is hardly necessary to point out that various methods heretofore employed on the one hand do not meet these requirements, and

on the other hand are not free from incidental drawbacks and even dangers.

The object of this communication is to describe a thermotherapeutic technic which seems to meet better the practical requirements of certainty, control, and freedom from undesired incidental effects.

As is well known, the bodies of warm blooded animals possess a thermostatic mechanism whereby, under widely varying external conditions, a fairly constant temperature is maintained. Not all details of this thermostatic mechanism are as yet understood, but it has been shown that it is a two-fold mechanism, capable on the one hand of regulating heat production and on the other hand of regulating heat dissipation.

Exposure to cold atmosphere gives rise to an increased rate of oxidation and to shivering and other movements which have the further effect of increasing heat production. Such exposure also gives rise to vasomotor contraction of peripheral arterioles, which determines a reduction in the flow of blood to the body's surface and a reduction of activity of the sweat producing glands; and these effects in turn bring about a reduction of heat dissipation by conduction, radiation, and evaporation.

Exposure to a warm atmosphere produces the opposite results. Heat production is reduced, and dissipation is increased.

It is a very easy matter to control the mechanism of heat dissipation in such a way as to overcome the thermostatic mechanism of the body, as will be judged from the results of the following experiments:

Experiment I.—Healthy young woman. Temperature by mouth at beginning of experiment, 97.5 degrees. Subject was placed in a bath tub containing water at 105 degrees at 4 p. m. The entire body was immersed, excepting the head. Subject was kept in the tub 30 minutes. Temperature of water in tub varied as follows: 4.06 p. m., 106 degrees; 4.13 p. m., 105 degrees; 4.18 p. m., 104 degrees; 4.22 p. m., 103 degrees; 4.27 p. m., 102 degrees: Subject's temperature by mouth varied as follows: 4.10 p. m., 103 degrees; 4.25 p. m., 103.8 degrees. Pulse varied as follows: At beginning of experiment, 80; at 4.22 p. m., 120. Respirations at 4.30 p. m. were 20 per minute and somewhat labored.

At 4.30 p. m., subject was taken out of the tub and placed in bed. The course of the temperature thereafter was as follows: 4.43 p. m., 101; 5.00 p. m., 98.6; 5.30 p. m., 99; 6.00 p. m., 99.1; 7.00 p. m., 99; 8.00 p. m., 98.9; 7.05 the following morning, 97.6.

Following removal from the tub, the pulse varied as follows: 4.49 p. m., 94; 5.06 p. m., 76; 5.31 p. m., 74; 7.00 p. m., 78; 8.00 p. m., 72; 7.10 the following morning, 62.

Respirations also went down and were found at 4.51 p. m. to be 14.

Subject said that the temperature of the water in the tub was at no time uncomfortably hot. At 4.22 p. m., complained of slight pounding in the head and somewhat labored breathing. At 4.35 p. m., five minutes after removal from the tub, she complained of a little dizziness, slight nausea, slight cloudiness of vision, "a feeling like being on a boat, resembling slight seasickness." The face became flushed and covered with fairly profuse perspiration eight or ten minutes after the beginning of the experiment, and remained more or less so for an hour and a half following removal from the tub.

A feeling of slight faintness and dizziness was complained of during the rest of the day, and in less marked degree during the entire following day. It seemed to be still perceptible subjectively on the third day, but not thereafter.

It will be noted that at no time did the body temperature by the mouth attain that of the maximum temperature of the water in the tub. It is, however, also to be noted that, while the water in the tub between 4.22 and 4.25 p. m. was 103 degrees, and at 4.27 p. m. it had gone down to 102 degrees, the temperature by the mouth, taken by inserting the thermometer at 4.25 p. m. and removing it at 4.30 p. m., was 103.8 degrees.

It is, of course, not to be assumed that the temperature of the body was raised to the above mentioned degrees by such rapid conduction of heat from the water into the body. The elevation of temperature was probably accomplished in the first place by eliminating dissipation which would normally occur through radiation, conduction, and evaporation. The thermostatic mechanism of the body could, under such conditions, protect the body against elevation of temperature only by greatly reducing or discontinuing heat production, but this mechanism was evidently inadequate. Heat production continued, so that within ten minutes an internal temperature of 103 degrees had been attained.

Experiment II.—Healthy woman, 43 years of age, placed in tub and immersed in water at a temperature of 99 degrees, at 1.47 p. m. This subject was kept in the tub for a full hour and the water temperature allowed to vary only between 98 and 99 degrees. Temperature by mouth

at 2.17 p. m., 99.9; at 2.41 p. m., 99.7. Pulse at 2.35 p. m. was 96. Respirations at 2.36 p. m., 18.

Face became flushed a few minutes after immersion and slightly covered with perspiration. Towards the end of the hour, this subject also complained of slight pounding in the head and slight weakness.

This experiment also shows, and more clearly than the first experiment, that the elevation of body temperature, under conditions of immersion in warm water, is not attributable entirely to conduction of heat from the water into the body, inasmuch as the body temperature in this case had quickly risen to almost a full degree above the maximum temperature of the water in the tub.

Experiment III.—A healthy girl 15 years of age. Subject was placed in the tub at 12.25 p. m., and immersed in water at 86 degrees. Temperature, pulse, and respirations at beginning of experiment were respectively, 98.5, 88, and 16. At 12.45 p. m., pulse was 82. At 12.48 p. m., respirations were 14. At 12.50 p. m., temperature by mouth was 97.7.

Slight shivering started within three minutes of the beginning of the experiment, and grew somewhat more marked toward the end. Very slight, scarcely noticeable cyanosis also developed toward the end of the experiment.

The immersion in this case was in water at a temperature which caused little, if any, discomfort. Heat production was probably increased by shivering, but this was slight, and it must be assumed that heightened oxidation took place. Heat dissipation by evaporation was, of course, entirely removed, but dissipation by conduction was greatly increased. The thermostatic mechanism of the body was overcome, as the increased heat production failed to fully counterbalance the increased heat loss by conduction.

Conclusion.

It is possible to increase or lower body temperature by immersion of the body in water at different degrees of temperature, varied according to needs, but within limits readily borne without serious discomfort. The only apparatus required is a tub such as is used in mental hospitals for the administration of continuous baths.

THE NEED FOR COOPERATION BETWEEN THE LEGAL PROFESSION AND THE PSYCHIATRIST IN DEALING WITH THE CRIME PROBLEM.*

By DR. WILLIAM A. WHITE.

The fact that the American Bar Association has set aside a session to be devoted to psychiatry is of much more importance and significance than anything I shall say, and yet the opportunity is unique and I shall do my best to make clear the point of view of psychiatry.

Psychiatry, as that department of medicine which deals with mental disease, is in a position of peculiar advantage for observing the springs of action of human conduct, and the psychiatrist during the present century has come to certain convictions regarding the explanations of various types of human conduct which in the main are based upon a careful analytic study of the patient's past experiences both as an individual and as a social unit. At the same time the psychiatrist in his contact with the legal machinery finds that the methods of procedure are such as to make it well-nigh impossible for him to mobilize his knowledge in any useful way for the assistance of the courts in dealing with the individual problems that come before them. He has come to feel that the criminal law and methods of legal procedure are based upon concepts which are largely obsolete from his point of view, and that penal methods as they at present exist are quite inadequate to deal with problems of human behavior. The common factor that runs through the whole problem of crime and its various manifestations is the psychology of the individual offender, and the law with its emphasis upon the act rather than the actor he feels has failed to give this factor adequate consideration. Future progress must therefore, he believes, proceed along the lines which have been found useful in science generally, namely, a more careful analysis of the individual

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material, with the development of increased facilities for handling the great mass of individual problems that present themselves.

If I were called upon today to testify as an expert in a criminal case involving the mental state of the defendant, I would undoubtedly be asked questions that were formulated more than a century ago. I would be asked, among other things, whether the defendant knew the difference between right and wrong; and I would probably be asked by means of a hypothetical question whether I thought the defendant responsible.

To the psychiatrist such questions as these have the effect of making him feel almost hopeless in any attempt that he may make to be of assistance to the court and the jury. Such questions, particularly the former, the right and wrong test as it is known, represent antiquated and outworn medical and ethical concepts, which have become crystallized, in the course of time, into rules of law; whereas the question of responsibility carries with it a metaphysical implication and the more one thinks of it the more one feels quite incapable of answering it.

Law and medicine, because they have each been pursuing their own ends independently, have come to talk, as it were, different languages. The aims of both professions are however, I believe, the same, so far at least as they affect the common weal, but they have thus far been unable to get together largely because they do not understand each other. Each profession has its background and traditions and habits of thought radically different from the other and finally each in its turn comes to talk its own language, which members of the other profession do not understand. There is a sore need for overcoming this difficulty of understanding, but so long as doctor and lawyer meet only as witness and cross-examiner there is little hope. We must get together and work together, and it is on the basis of the recognition of a common purpose that an understanding will come.

One important reason for this lack of understanding as between the legal profession and the psychiatrist lies in the fact that law has the traditions of many generations back of it which it has consistently fostered and in accordance with which it has evolved, while the particular department of medicine known as psychiatry, although it is as old as law, in its recent developments is still very young. In fact modern psychiatry may be conceived of as having

been born in the present century, and with the characteristics of youthful energy which are so much in evidence these days it has largely broken loose from many of the old traditions and in so doing has developed viewpoints and a language quite its own.

Our two professions meet most often in matters of commitment and at criminal trials. Questions of commitment, though important, I will not discuss. I will confine my few remarks to questions of criminal law and practice. In the first place, as the psychiatrist looks at the problems of the criminal law he feels very definitely that the law and the practice that has grown up under it have originated in the perfectly human desire for vengeance as directed against the offender, and that punishment, which is its main objective, is meted out in response to this underlying motive. Now perhaps no one thing characterizes American psychiatry more definitely than its invasion of the social field. Psychiatry from the beginning of the century, as exemplified specifically in the work of the juvenile courts, has manifested a distinct trend toward socialization and has come as a consequence to view as alien to its methods either the satisfaction of or the indulgence in the vengeance motive or the feeling of any special security in meting out punishment. In these respects its development has been along similar lines with development in other directions, namely, in the educational field, the industrial field, the fields of child guidance and of mental hygiene. And so it has come to feel that the remedies upon which the law seems to repose its faith are hangovers, as it were, from old theological and moral ideas that have survived their period of usefulness in this twentieth century civilization. Not that I have any quarrel with religion or with ethics, but both religion and ethics need to and have developed. My quarrel is with the persistent utilization of concepts that no longer serve the purpose which they may very well have served at one time but which have become largely inert in the course of development.

Thus psychiatry comes to look upon the methods ordinarily employed in the criminal courts as outworn and inefficient, not to say inadequate, and feels that by persistence in pursuing them the real important social values are obscured.

Once upon a time, so the story goes, it is said, and it may be true now for aught I know, that if a South Slavonian had a

mind to pilfer and steal at the market all he had to do to insure success was to burn a blind cat and then throw a pinch of its ashes over the person with whom he was bargaining; after that he might take what he liked from the booth, for the owner would be none the wiser, having become as blind as the burned cat with whose ashes he had been sprinkled. The method, you see, is a very simple one, and it is one which we constantly employ. By maintaining faith in outworn concepts we are blind to the real issues involved. These concepts function much as the superstition of the Slavonian peasant, for as long as they are adhered to progress is effectually blocked.

And so to begin with, the psychiatrist necessarily feels that the solution of the crime problem will not come by increasing the severity of punishment and the rigors of prison discipline, that to attempt solution in this way is to attempt the impossible, for evolution is an irreversible process and mankind having once started out upon the path of humanitarian endeavor cannot expect to revert with any prospect of success to the practices it has given up on the way. Criminal law, we believe, needs to change its point of view from that directed to the individual offender as a morally perverse person who ought to be punished to the problem he presents as related to the welfare of society. It needs to be socialized.

At this point I may expect you to thoroughly disagree with me, for I am sure you are of the opinion that that has always been the very aim and object of our penal system. This I will concede, but with the qualification that the effort has been made to attain this aim and object, not by dealing with a real individual but by dealing with a hypothetical individual. Let me elaborate this point. The criminal law has always been primarily interested in certain acts which it defined as criminal, and little if at all interested in the actual criminal himself, the actor. There has been an underlying implication that there was such a thing as the average man, "the man in the street" as he is so often called, that all men were born free and equal, at least before the law, and that each, therefore, had to be treated in precisely the same way as the result of having performed similar acts. Now we know, if we know anything at all, that men are not born equal, that no two men are alike, and that an act which appears to be the same on the surface when performed by many different men has back of it in each instance a

series of antecedents which make it in every case the outcome of a chain of events which stamp it as unique. To think of it otherwise would be as if in medicine we undertook to treat all fevers in exactly the same way. We have learned to differentiate fevers: we have learned the cause of these various fevers; we have learned how they respond to different types of remedies, and how, therefore, each of them has to be conceived as different and treated as different. To think of them as all the same, or to think of all people who perform the same acts as being animated by the same motives, is to regress to an earlier period of development before such differentiations were made; and that is why I say that the law in undertaking to deal with all people who commit a specifically defined act in the same way is not dealing with the real individual who comes before the bar of justice but is dealing with a hypothetical individual.

Now we have learned in medicine that if we are to understand the body that one of the things we must do is to begin to take that body apart and examine its various constituents, and so has developed the science of anatomy, and with the development of the microscope the science of histology, which examines those minute cells of the body which are too small for the unaided eye to see. In this way we have come to an understanding of certain diseases which could never have been reached, in all probability, in any other way. And so, as psychiatrists, we believe that the law is now in a position where in order to make its next forward step it must begin this process of taking apart its concepts and examining their constituent parts. It must begin to investigate not alone the act but to study the actor with a view to discovering his motives, the sort of man he is, the whys and wherefores of his conduct, the methods that control it and if possible the ways to redirect it into more socially acceptable channels. This method of investigation, with which the psychiatrist is familiar, will not alone throw light upon the individual problem in each instance, but by an accumulation of data will throw light upon the larger social adjustments with which the law is primarily interested, just as the work of the microscopist in medicine has not alone resulted in a knowledge of the cells but has thrown light upon the nature of diseases which involve the whole organism and so assisted in bringing about a rational

therapy that could be applied from the point of view of the welfare of the organism as a whole.

In view of what seems to me, at certain points at least, a breakdown in the legal and penal machinery for dealing with crime, it would seem that the time was ripe for this union of effort between psychiatrist and lawyer, and because of the importance of the issues we feel that such a union should at least be encouraged.

If my conviction is correct, and I believe it has ample support, that the whole scheme of the criminal law, founded as it is on a belief in the adequacy of punishment, has its ultimate sources in vengeance, is it not worth while, and is it not time, to examine this system and see whether punishment alone is likely to be longer adequate under present social conditions as we see them developing? The judge of today confronted by multitudinous criminals and multitudinous crimes is in much the same position as a doctor would be with an equally long list of patients and diseases if he were limited to three remedies, such as quinine, nux vomica, and aspirin. The judge is expected to negotiate all his problems by the application of the death penalty, imprisonment, or fine.

If vengeance diluted and disguised as deterrent punishment has failed or is failing, why not look about and see if other means are not available?

In these days of rapidly changing ideas and ideals our thinking is unusually plastic, for the foundations that supported the mental structures of the nineteenth century have been greatly weakened. Therefore we should not feel that we are obliged to go altogether along beaten paths but may reasonably expect to find some really new, creative, forward ways of thinking about these age-old problems.

Notwithstanding that this suggestion departs from the traditional conservative habit of the legal mind I do not feel that I am making a meeting of minds, legal and psychiatric, impossible. The function of the United States Supreme Court, if I correctly interpret Mr. Justice Holmes, is not to maintain the Constitution unchanged in the mold of the thought and the time of those who wrote it, but to keep it plastic, a body of principles only, keenly responsive by constant reinterpretation to advancing civilization and culture. I think, too, with Mr. Carter, late of the New York Bar, that it may not be the sole function of the legislatures to

make the law, but to find it. No one ever accused Newton of making or even inventing the law of gravity. He but discovered it and formulated it. Social laws are as much natural laws as is the law of gravity, and legislators can no more make natural law than could Newton make the law of falling bodies.

Social laws, in part at least, have their roots in the natural endowments and the heritage of man and come to expression in their actions and in the institutions they create. We need to find these laws and work in harmony with them, not against them.

In a word, my view is that we should free ourselves from the magic spell of words as successfully as we are free from the magic spell of the ashes of a blind cat, such words as "insane" and "criminal," and search for ways and means to protect society from the dangerous and the anti-social; and having done this, to further develop ways and means for turning back into society, when this is possible, social units that are capable of more efficient and socially valuable functioning.

I know the alleged constitutional barriers that stand in the way but I have faith that if we are right we can find ways to overcome such obstacles, else our plastic Constitution that can be adjusted to growing demands has no meaning and will sooner or later become an obstacle to progress. This, however, I do not believe need eventuate, for I see all about me evidences that just such changes are really taking place.

Perhaps there is no better example than the Juvenile Court, which has entered the field of penology and boldly cast aside all the usual methods of procedure and developed a program in absolute contradiction to the established traditions, inasmuch as it does not use its machinery for fastening a crime upon someone and then meting out a seemingly appropriate punishment, but its whole endeavor is to find what is wrong in the situation that develops as the result of its inquiry into the nature of some overt act that has brought the child before it, and then, with all available facts and the results of a careful study to go on, it tries to find and apply a remedy.

Such a method of procedure would never have come about as an outgrowth of the penal system. It had to be set up as a separate institution. Now that it is set up, however, it is dealing with cases that the criminal courts used to handle. By such a

method it is possible to see how radical reforms may come about that never could have resulted from a development of the old system. It seems to have some of the elements, biologically speaking, that make for the creation of a new species. I am thinking of geographical isolation.

It needs only that we should appreciate and understand the factors involved and make them part and parcel of our conscious equipment to hasten the process.

Whatever may be done, the problem is serious and difficult and seems to me to call for greater individualization than at present, just as we have found that the problem of treating mental disease is not solved by herding large numbers of the so-called "insane" into public institutions, but that success is achieved in proportion to our ability to deal with the specific, concrete problems of each patient.

When we have a sick individual we examine his several parts, to get light on the nature of his illness. When we have a sick society we likewise need to examine its several parts, the individuals. I am heartily in accord with a study of the various social conditions and their influences on crime, industrial and economic conditions, food costs, the law, religion, morals, etc., but we need in addition to study the individual delinquent. It is to this study that we believe psychiatry has something to contribute and we are here in this spirit of cooperation.

Perhaps, as I have said, the most outstanding contribution that American psychiatry has made to the study of mental disease and disorder has been its emphasis on its social implications. These social implications can no longer be glimpsed. They already loom too large and too important to be ignored and must be given adequate consideration.

Penal practice can no longer academically view the principle of letting guilt and punishment fall where they will if in its insistence on punishment of the individual it creates greater wrongs than it seeks to correct.

However much satisfaction may result from tracking down an offender, identifying him and bringing him to trial, conviction and punishment, it is coming to be appreciated that the automatic carrying out of this sequence may result in the most serious consequences. Anyone brought intimately into the personal and family

lives of individuals knows how much tragedy is brought to pass in the name of Justice. The law cannot afford to be longer blind to these natural consequences of its actions.

Our prisons contain great masses of humanity, and within their walls are incarcerated the solutions of most of our most pressing crime problems, if we had but the wisdom to interpret the meanings that are incarnated in the lives of the prisoners. Instead of being institutions of frustration, repression, confinement, punishment, harsh treatment and suffering they need to become institutions that have established records for sincere scientific study and research and conscientious endeavor. To be sure, they are moving in this direction, but all too slowly, and they need all the help that can be given them from an understanding bar to which we psychiatrists will be only too glad to contribute.

From the social point of view that I have mentioned, is it not obvious that our criminal trials have become a blot upon our land? Instead of a serious inquiry into the whys and wherefores of anti-social conduct and the best ways of dealing with it in a particular case, they have become a battle of wits for the delectation of a sensation-loving public, spectacles which hardly can be expected to improve the public mind—and because of their emphasis on the act rather than the actor, the judge tends to become a referee deciding on points rather than a wise, socially-minded humanitarian dealing with an individual human being.

How can we conscientiously go on supporting a system that perpetuates these methods? We send the convicted criminal to prison, where we expect him to be treated with rigorous discipline, oftentimes cruelly, and finally expect the paid employee of the State to take his life at a stated time, all this, to say nothing of the heritage of shame that reverts to the criminal's family unto the third and fourth generations, and the feeling of outraged justice that his family must have at being made to suffer for something for which they were not to blame, with often a dumb, inarticulate feeling that the criminal was more the victim of circumstances over which he had no control rather than a culprit in the true sense.

How much do we know of the evils wrought by these social ramifications of our present system? Not much, I fear, but we can no longer assume their non-existence or if not their non-existence, their unimportance. The psychiatrist knows something

of them and he must be led to the belief that the system that fosters them is radically a wrong system. The psychiatrist knows that no enduring structure can be built on fear and hate. The exclusive appeal to these two motives must in the end defeat itself. We do not believe it helps to call an act sinful or bad, and we do believe it helps to find out how the act came to pass in order that the tendency back of it may be attacked at its source.

I have spoken about the vengeance motive back of the criminal law and punishment as an outcome of this motive. I have indicated that one of the serious defects of the present system is that this motive still functions but under a disguise, namely, the disguise of deterrence, which makes it seem like something else. This is a mechanism that we are familiar with in psychiatry. All through our social and individual lives primitive instincts seek to escape the bonds of cultural restrictions and come to expression. In social institutions these instincts manifest themselves by way of traditional beliefs and methods of procedure which in order to be retained are given the odor of sanctity and the authority of age. It has been said: "When we realize that this and that motive of ours is 'sacred' we may be sure that it is a childish impression which we have never carefully scrutinized." I am quite sure that I am right when I say that the prisoner who is sentenced at the bar of justice is a hypothetical individual. He is not an individual who has been sized up in all of his parts, his assets as well as his liabilities dispassionately evaluated. He is an individual whose personality has been built up in a way to explain the crime with which he is charged, and of his personality only the more superficial things ever get into the picture. In fact it becomes necessary to build up such an artificial personality if the emotion of vengeance is to be loosed against him. If one really knew the personality of the average criminal, how pitifully inadequate it was to cope with the situation in which he found himself and how logical and understandable his conduct under all the circumstances of the situation really was, it would be very difficult to get oneself into a state of mind that permitted the severity of punishment which the law often requires. In other words, you will see that I am painting here very inadequately the picture which is so well known to the anthropologist, the picture of the scapegoat; and in my opinion the criminal functions in this capacity still in our modern society,

where his trial, in harmony with this conception, has become an attenuated Roman circus which nowadays instead of appealing to the handful of individuals in the courtroom is broadcast over the length and breadth of the continent. It is this situation that permits all of the hideous results that flow naturally from such a system, that is willing to mete out punishment to an individual for what he has done no matter how much destruction may be wrought upon numerous other and quite innocent persons who may in some way be related to him. It is such a system that will permit the alleged brutalities of the third degree, which is but an example of the repercussion of the system upon some of those who are a part of it.

It is a principle of the criminal law that a person is responsible for the natural consequences of his acts. If he fires a loaded revolver into a crowded thoroughfare and kills someone he must take the consequences. Why should not the same principle be applied to the application of justice, and why should not the side issues be evaluated to see whether the net result is for better or for worse? All of which results in the general proposition that I believe that at the present writing the methods of criminal courts are not calculated to accomplish very much in either preventing crime or reforming criminals; that to take the next step forward methods will have to be developed that are more like the methods in some of our juvenile courts; that the inquiry into a given individual case will have to take into consideration as far as possible all the attendant circumstances and the various ramifications, individual, family and social, not only of the crime but of the remedial efforts as well; that vengeance and punishment, in fact all moral issues, should be discharged from consideration so far as their emotional results in vengeance and punishment are concerned; that anti-social conduct should be considered as dispassionately as a broken leg; and that the individuals who cannot get along in the community should be dealt with not as guilty but as liabilities from which the community has a full right to protect itself but toward which the community also has certain responsibilities.

In order that such a scientific approach to problems of crime might be successful I will make the following concrete suggestions,

which give perhaps better than anything that I have said the way I think about it:

1. I believe fully in society's right to segregate the dangerous anti-social types so long as they continue dangerous. This means largely the doing away with fixed sentences, at least for certain types of crime, and making the return to freedom conditional upon some change in the individual that gives one a right to suppose that perhaps he will function more effectively as a social unit than he has in the past.

2. The elimination of punishment as a vengeance motive and its retention only if used for definitely constructive ends for conditioning conduct.

3. The gradual transformation of prisons into laboratories for the study of human behavior and the conditioning of human conduct.

4. The abolition in the trial of the hypothetical question.

5. The discarding of the concept of responsibility. The idea of responsibility is, as I have said, largely a metaphysical one. People who act anti-socially society must be protected from. So far as possible this should be done without raising metaphysical questions. How they should be cared for is a matter depending on what sort of persons they are and does not require a consideration of such abstruse matters.

6. The making of the positions of district attorney and of judges of criminal courts permanent positions and the appointment thereto a result of competitive examination protected by civil service laws. The requirements for filling such positions should be a knowledge of modern criminology in its various ramifications.

7. I think it would be an excellent thing, and I see no reason why it should not be done, to have such district attorneys and such judges in the course of their educational preparation serve internships in psychiatric clinics and prisons, just as physicians do in their various medical specialties.

In what I have said please do not misunderstand me and get the idea that I am critical of the law in the abstract or of lawyers, of courts or of judges. Criticism as such is of little value for good but when it is coupled with a realization that what we criticize in others we ourselves possess—that others' faults are motivated by tendencies that are common to us all—it makes for a mutual under-

standing and tolerance that should be of great value in mobilizing new principles.

The present system I feel is an anachronism. Whatever may have been its use, that use is rapidly being outgrown and readjustments are necessary to a world that has changed much since the principles that govern its functioning arose. Much of it, it seems to me, is ineffectual and inadequate, much of it is stupid. Is it possible by a union of the learned professions to find better solutions? The psychiatrist believes that one direction in which to seek is towards a better understanding of the criminal in all that that means, his heredity, his physical and mental make-up, his social and family background, his motives, their conditioning and their objectives, and the possibilities for their modification.

Let me close by a quotation from the late Dr. Thomas W. Salmon, who was one of the outstanding leaders in psychiatric thought in this country. He said that "We" (meaning the psychiatrists)

> should emphasize the fact that in all these simple and complicated situations with which the court has to deal human behavior is the one common factor. I suppose there is hardly a function of police courts or prisons that has not for its object the modification of human behavior or repairing the consequences of human behavior of a type that has been harmful to society or to an individual. All the ignorant, clumsy, awkward, misdirected, harsh and futile measures of the administration of justice might be corrected and still only relative success follow if there is not an increase (on the part of other persons who handle these situations) of the bases (*sic*) of human behavior and the methods by which they can be directed and controlled.

I fear that my presentation has been somewhat disjointed. If so, it is because I chose to give you an idea of the spirit of psychiatric thought rather than to discuss in detail any specific problem. We do not understand, naturally, how to effect the various changes we suggest in the legal machinery. That we conceive to be the work of the lawyers. But we do feel that we have a contribution to make along the lines I have suggested and that if these objectives are borne in mind the necessary legal formulations to make them effective can be found.

> He who has tamed the elements shall not live the slave of his own passions.—BRYANT.

BIOLOGICAL AND PATHOLOGICAL ASPECTS OF BEHAVIOR DISORDERS.*

By HERMAN M. ADLER.

The earliest conception of the factors underlying behavior disorders is probably that of innately good men temporarily possessed by demons or evil spirits. This conception still persists in the minds of mothers of young criminals who stoutly maintain that their young offspring, to others thoroughly depraved and tough, are model boys at home and that their wicked conduct is quite unaccountable.

The next theory to explain crime, and one whose influence still persists forcibly in many of our customs, is the theory of innate evil. According to this it takes *effort* to be good, *no effort* to be evil. Since the natural impulses of mankind are toward evil, it behooves the leaders and custodians of the public morals to apply discipline to maintain order. For the wise, the discipline of example might suffice; for the average, the discipline of experience; but for the wicked, nothing less than the discipline of punishment. How much this concept still persists is shown by our conduct toward delinquents, however much we might deny any such ideas in a logical discussion.

With the rise of modern biological science, especially pathology, came the attempt to explain criminality as a manifestation of *disease* and we had such theories as the criminal anthropology of Lombroso, all based on the belief that disordered behavior is the direct result of *specific* causes. The discoveries in bacteriology strengthened this belief in definite causes for all pathological conditions and gave impetus to research along these lines in the remoter fields of psychology and criminology. The observations were, in

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Studies of the Illinois Institute for Juvenile Research, Herman M. Adler, Director, Series B. No. 113.

the main, better than the inferences, and important contributions to the knowledge of the physical signs of constitutional defect and disease were made. Many anthropological data were accumulated along the lines of the study of physiognomy and of malformations. But somehow, in spite of the apparent soundness of the methods employed, the clear cut results of bacteriology and pathology failed of realization in the criminological field.

The discovery at about this time of modern brain "localization" started a parallel theory that all personality whether criminal or not arose from deviations in the structure of the brain and that any defect there whether due to inheritance, to disease, or to deformity might cause criminality.

Still later came Binet's work on mental measurements, so called, which had a great effect on conception of criminality. Criminals were immediately measured by his scale (in fairly large numbers, for institution inmates are easily accessible material) and a surprisingly high percentage of feeblemindedness was found. Promptly everyone jumped to the conclusion that here was one of the important causes of criminality. Five or six years after these studies of institution populations were made, it was for the first time possible, by means of the army tests to study a really large group of the non-criminal population. These tests showed this same high percentage of feeblemindedness in the socially normal population and so exploded this theory of feeblemindedness as the major factor.

All these theories—possession by demons, original sin, disease, brain malformation, feeblemindedness—might be classed as constitutional—that is, they imply that criminality is due to something inherent in the criminal's make-up.

Opposed to these theories was another set conceiving criminality to be the result of factors entirely outside the individual criminal. These might be designated as the environmental theories, as opposed to the constitutional. Here we find the economic point of view, whether in the radical degree of Carl Marx's doctrine or in the milder one of the social worker who ignored the "class struggle" but still put crime down to poverty, labor conditions, etc. There were still other variations of the environmental theory but fundamentally all are the same—all hold that men are *good;* it is ***environment*** which makes them bad.

A great deal of evidence has accumulated to support both of these sets of theories—the constitutional (hereditary, deterministic) and the environmental (acquired, preventable). If either represented the whole truth the general direction of remedy would be clear. In the first case, eugenics plus extermination of the unfit would wipe out the problem of crime. In the second, improvement of social environment, education, etc., plus disciplinary treatment by legal and social penalties would suffice.

It cannot in fairness be said that either method has been tried completely enough or over a long enough period of time to render any final proof or disproof of the two divergent theories. Sufficient evidence, however, is at hand to make it extremely doubtful whether either explanation can represent the entire truth. Both are probably partly true; but whether true or not the remedies implied are so drastic and all inclusive that there are practical bars to their application which for the present at least make them virtually impossible.

It is therefore important to consider the possibility of other explanations which while recognizing whatever is valid in both these sets of theories will in addition include points not covered by either, and, perhaps more important still, which may give us a clue to the development of diagnostic and practical methods of treatment such as may be possible at the present time, even with our very limited comprehension of the fundamental causes of criminality.

The factors involved in behavior reactions are so complex and so numerous that it is quite impossible either to conclude that two cases are identical or to predict accurately the behavior of any given individual under given circumstances. That is, neither the individual nor the circumstances are completely knowable. Since we are dealing, therefore, with unknown entities and quantities we must confine ourselves to *relationships*. Briefly this means that we may be able to observe and evaluate a reaction although we may be in ignorance of some of the elements entering into it. In biological science such studies of reactions between unknown reagents, especially in the case of the so-called equilibrium reactions, are well known. We might, therefore, take from biology some of the general principles pertinent to our own enquiry. Some of the rules of biology applicable here are the following:

First, that a healthy organism is able to maintain equilibrium with the environment provided the variations of the environment do not exceed the outside limits of the organism's ability to adjust. And it might be added that the limits of ability in a healthy organism are very wide; that there is an ample margin of safety; one has only to think of the amazing numbers of babies that have survived under the conditions of prehistoric Briton or of modern slums. The breakdown of adjustment, therefore, indicates either that the individual is weak or disordered, or that the environment is unfavorable and to an extent dangerous to the individual. In view of the relatively stable condition of the environment, both general and social, especially in our modern civilization, we will normally give preference to the belief that the inadequacies of the individual rather than of the environment are at the basis of the disordered behavior.

A second biological principle applicable here is that, the further removed from health the organism, the lower the threshold at which disequilibrium sets in. Even the normal variations of environment may present more of a strain than the organism can meet, if it is very inadequate in one or more respects. The success of many other individuals living under similar conditions strengthens the probability that variations in the individual characteristics are responsible for the discrepancies in behavior.

Society is a mechanism for reducing the amplitude of variations of the environment—whether by street lighting and sewage disposal or by compulsory education and the regulation of dance halls. The whole responsibility of parents to their children is for this; the parents are actually concerned with cutting down the amplitude of the environmental changes, both physical and social, to a point where the child, in spite of its feebleness, can adjust. For the baby this means an almost complete annihilation of environmental variations, especially the physical. The responsibility of the parent for the child's environment, with a shifting of emphasis to the social factors as the child grows older, continuously decreases in total amount until the age of legal maturity is reached.

There are many reasons for assuming that the margin of safety provided by nature is such that little evidence of disturbance of behavior is likely to appear in the course of ordinary every-day life.

It is, after all, only occasionally that an individual becomes conspicuous because of serious transgressions. When this does occur it is necessary to investigate not whether there is any specific pathology which must inevitably have led to the particular act but rather why the margin of safety was not sufficient in this case.

In certain groups of cases where the pathology is very marked this, of course, is obvious—since the organism is so patently unhealthy, we expect its threshold of adjustment to be low. Thus it has long been accepted in general and recognized in the law that certain pathological alterations of mental function occur which may produce behavior so dangerous as to require the enforcement of strict measures of restraint in order to protect the community. There are at least two general categories of such pathological conditions.

The first, mental deficiency, is a fairly recent classification made possible by the advances of psychology and of psychological medicine during the past generation. The other, that of insanity, has been recognized since antiquity. In uncomplicated cases little difficulty is experienced in arriving at a legal decision. When however, the circumstances are such as to cloud the issue with extraneous material which is likely to occur in any seriously contested case, the inadequacy of scientific criteria and the conflict of divergent professional views often result in complete confusion. In a few states, as well as in England, this difficulty has been met in criminal cases by clearly separating the concept of guilt or innocence of the accused on the one hand from the question of his sanity on the other. When this procedure is available it is possible for the jury to bring in a verdict of " guilty and insane " or of " not guilty and insane," or the reverse.

The confusion between medical and legal terminology is another cause of difficulty in applying psychiatric methods to criminal cases. The term " insane " as used at present in this country is a legal one and should be confined to legal usage. But it frequently happens that the medical expert in a criminal trial where the question of sanity is raised, interprets the term " insanity " as synonymous with " psychosis"; that is with mental disease, or still more with pathology in general. According to the usual legal definition, however, the distinction lies not in whether the defendant is suffering from a

diagnosticable malady, but in whether there is sufficient evidence to prove that he is incapable of understanding the nature of his acts or of distinguishing between the moral values of right and wrong in regard to them. This criterion is one which while apparently simple and sensible is so metaphysicial in its implications that a clever witness may arrive at any conclusion he pleases without technically violating his oath.

But in those cases where the pathology is not so extreme the reasons why the ordinary margin of safety was insufficient are proportionally less obvious—though no less pertinent. This group includes the large chapter of mental disorders which do not properly come under the heading mental disease or deficiency either according to the legal or the psychiatric classification. The advance, in recent years, in psychopathology and in psychology has shed an increasing illumination on these border-line conditions. Here belong not only the severer forms of psychoneuroses, of hysteria, or neurasthenia, but that protean collection of human grotesques classified by the psychiatrists as "psychopathic personality" or "constitutional psychopathic inferior" or similar terms. Here are found many of the social problems which vex the police, the bench, and the private welfare organizations of the community. The vagrant, the hobo, the drunkard, the sadist, the profligate and the card-sharper, the confidence man and the prostitute, the drug addict and the pervert are all included in this group.

The test of sanity is of no avail. Their difficulties are not due to disturbances of consciousness or of powers of observation. They realize only too well the implications of their various acts. Their trouble is that they are impelled toward their dangerous behavior by a desire or passion against which they struggle in vain. As by weighting the safety valve unduly the pressure may be kept in for a time only to explode the more disastrously when the internal force finally becomes too great any longer to be restrained, so the danger of their behavior is only increased by the attempts at repression on the part of the law. The difficulties of the conditions under which the psychiatrist now works, referred to above, become even more hampering in dealing with these cases: the fact of whose pathology has not yet been accepted by the consciousness of the public as has that of the feebleminded and the insane.

Many theories have been advanced to explain their states. Some are based on the assumption underlying—as yet undiscovered—organic defects; others suppose them to be due to incorrect adaptations in early life perhaps because of unusual and deleterious experiences. It is obvious that where an individual for whatever reason engages in criminal acts with a full realization of the consequences he is incurring, there can be no question of deterring him by fear of punishment. The fear, to be sure, affects him, but only to make him seek greater obscurity for his life and acts or perhaps in some instances to increase the momentary pleasure just because of the risk. The gambler's psychology is simply added to that of his peculiarity.

From the medical standpoint the problem resolves itself into one of the early identification of these individuals and their control by force of law *before* their transgressions have become serious. This is perfectly possible in a sufficiently large number of cases to justify the belief that through this procedure alone the criminal rate could be reduced to a more reasonable level than now, and one more in accord with modern civilized standards.

It is apparent that, on account of changes in the psychiatric point of view, due to the accumulation of new knowledge and experience, there has appeared an ever-widening gap between it and the legal definitions.

Admitting all the present inadequacies of psychiatric knowledge, it is true nevertheless that the chief barriers to securing the benefit of such knowledge as we do possess, are presented by the inelasticity of the criminal law.

The situation, as it appears to many, is very unfavorable to the psychiatric expert. He is brought in to examine, often under impossible conditions, a criminal accused of a serious crime: the legal defenses are thrown round the subject who need not "testify against himself," who may by admission or commission mislead the specialist whether the latter is acting for the prosecution or for the defense. The psychiatrist finds himself in a situation where, in violation of all his professional principles, he must be partisan. He must take sides, furthermore, not in support of his scientific opinion but in a battle of wits based on rules of procedure that have little to do with the scientific evidence upon which, alone, he is qualified to base a judgment. The psychiatrist officially has no

concern with law, not even with justice; that he must leave to the legal profession. What he must confine himself to is scientific fact and its evaluation. But under our criminal law this is often made almost impossible. It is no wonder that he is coming to be regarded with suspicion when he makes his appearance in court. When testifying for the prosecution he is considered to be a tool of the officials; when for the defense, he is said to be venal. In either case he is believed to be actuated by motives of gain alone and willing to sell his opinion to the highest bidder. Aside from the strange fact that precisely the same conduct on the part of the attorney is not subject to such insulting attack, it is obvious that science does not flourish when partisan motives are dominant.

A final difficulty in applying our present psychiatric knowledge lies in the peculiar sentimentality of the criminal law. The psychiatrist recognizes many early signs of disequilibrium in the individual which make him more or less of a menace to the community but under the law he is powerless to deal with this potential danger unless the individual commits some crime. If the crime is a petty one, the law says, "This is excusable, let us try leniency." In other words, let us wait until some real disaster occurs before we are so harsh as to accuse this person of not being a fully responsible citizen. The psychiatrist, on the other hand, says this is not a question of an accusation but a question of facing facts. Here is a person of limited responsibility who, if left to himself, is likely to blunder in criminal habits, but who, if given no more responsibility than he is able to carry, under the direction of someone more reliable, will become a reasonably self-supporting, law-abiding citizen. If we wait until his behavior becomes really serious he will have acquired tastes and habits which will make it extremely improbable that he will subordinate himself to any authority whatsoever except his own will and pleasure.

From the practical standpoint all this implies the need of frankly recognizing in the law the responsibility for identifying and caring for these deviates while they are still young enough, in the first place, to accept the necessary control or guardianship, and in the second place, while there is still hope that by proper medical care and by special education and by the necessary tempering of their own environments, something can still be accomplished in the direction of building up in them an ability to adjust.

The law now recognizes such responsibility for the care of the insane. It recognizes a certain somewhat distorted responsibility (since its only treatment is punishment) for the criminal. It recognizes such a responsibility for the mentally defective child. Eventually it must recognize this for these other deviates during their childhood years before they have become offenders. Such a recognition of responsibility implies the delegation of the necessary authority to properly qualified persons to examine, diagnose and treat these patients. This same sort of authority physicians now have in the case of the insane. Coincident with this should go at least a minimum of training in the field of psychopathology as a requirement for the practice of law since the delegation of this authority and the safeguarding of the rights of these children reposes ultimately in courts.

Notes and Comment.

MEMORIAL TO DR. SALMON.—It seems eminently fitting that some suitable memorial should be founded to mark in some measure the service to psychiatry accomplished by the late Dr. Thomas W. Salmon, whose death occurred in August last from drowning, while sailing on Long Island Sound.

For this purpose a committee has been formed. Judging from the personnel of this committee we feel assured that whatever form it may decide upon for the memorial it will be one which will at once honor the memory of Dr. Salmon, suitably record his services in various fields of medicine, particularly in developing and giving an impetus to the mental hygiene movement and in the World War, and be a credit to those who have initiated and those who may contribute to its establishment.

The committee is composed as follows:

The Chairman and Treasurer of the Committee are Dr. Frankwood E. Williams, Medical Director of the National Committee for Mental Hygiene, and Dr. Samuel W. Hamilton, Assistant Medical Director, Bloomingdale Hospital, White Plains. The function of the committee is to consider plans proposed for a memorial and to receive funds for this purpose.

Other members of the committee are: Dr. George S. Amsden, Professor of Psychiatry, Union University; Dr. A. A. Brill, New York University; Dr. Sanger Brown, II, Deputy Commissioner, State Department of Mental Hygiene; Dr. Louis Casamajor, Professor of Neurology, Columbia University; Dr. Thomas K. Davis, Assistant Professor of Psychiatry, Cornell University; Dr. Menas S. Gregory, Director, Psychiatric Pavilion, Bellevue Hospital; Dr. C. Floyd Haviland, Medical Superintendent, Manhattan State Hospital; Dr. J. Ramsay Hunt, Adjunct Professor of Neurology, Columbia University; Dr. Smith Ely Jelliffe, Editor Journal of Nervous and Mental Diseases, New York; Dr. George H. Kirby, Director, State Psychiatric Institute, Ward's Island, New York; Dr. Charles I. Lambert, Associate Professor of Psychiatry, Columbia University; Dr. Sylvester R. Leahy, Brooklyn, New York; Dr. Mortimer W. Raynor, Medical Director, Bloomingdale Hospital; Dr. Wm. J. Tiffany, Medical Superintendent, King's Park State Hospital; Dr. Edwin G. Zabriskie, Attending Neurologist, Neurological Institute, New York; Dr. Clarence O. Cheney, Medical Superintendent, Hudson River State Hospital; Dr. William C. Garvin, Medical Superintendent, Binghamton State Hospital; Dr. Milton A. Harrington, Consultant in Mental Hygiene, Dartmouth College.

TWO PSYCHIATRIC FELLOWSHIPS OPEN.—The National Committee for Mental Hygiene announces that two fellowships for training in extramural psychiatry at the Institute for Child Guidance in New York City are available for properly qualified candidates.

These fellowships have been created by the Commonwealth Fund to provide special training for physicians who have had hospital experience in psychiatry, but who wish to prepare themselves for community work in the fields of child guidance, delinquency, education and dependency.

The fellowships are open to physicians who are (1) under 35 years of age, (2) graduates of Class "A" medical schools, and (3) who have had at least one year of training in a hospital for mental disease maintaining satisfactory standards of clinical work and instruction.

Inquiries and applications should be addressed to Dr. Frankwood E. Williams, Medical Director, the National Committee for Mental Hygiene, Inc., 370 Seventh Avenue, New York City.

GROUND BROKEN FOR NEUROLOGICAL INSTITUTE AT NEW YORK MEDICAL CENTER.—Ground was broken for the new $1,750,000 Neurological Institute at the New York Medical Center on October 19, 1927. The new building is being erected beside the New York State Psychiatric Institute and Hospital, creating a physical union of neurology and psychiatry at the New York Medical Center. A cooperative agreement has been entered into between the Neurological Institute and the State of New York for attacking the problem of mental and nervous diseases. The state institution is to be made ready for occupancy in April, 1928, and the Neurological Institute will be rushed to completion as soon thereafter as possible. The following additional units will function in their new buildings at the Medical Center during the spring and summer of 1928: Presbyterian Hospital, Presbyterian Hospital School of Nursing, Sloane Hospital for Women, Vanderbilt Clinic, Squier Urological Clinic, Harkness Private Patient Pavilion Service, and the College of Physicians and Surgeons of Columbia University.

Abstracts and Extracts.

GLUECK, SHELDON: *Psychiatric Examination of Persons Accused of Crime.* (Mental Hygiene, 1927, Vol. XI, p. 287.)

The Massachusetts law is a step forward in the legal treatment of mental disorders in criminal cases in that it represents an attempt at intelligent coöperation between the legal and medical professions. Previous legislation left the initiation of proceedings for mental examination of persons accused of crime to persons untrained in psychiatry. The Massachusetts law provides for routine mental examination of those indicted for certain classes of crime, *i. e.,* (1) Capital offenses and (2) Grand Jury indictments or Superior Court trials of recidivists of certain classes. The determination of mental status is made prior to the trial and rests with the department of mental diseases and not with lay juries, judges, etc. The law serves many purposes; prevents trials of the insane and saves them the ordeal and the state the expense; in cases where trial is resorted to the report of the mental experts would have considerable weight; educates the judges and prosecutors in the "psychiatric point of view"; provides for detection of developing disorders early in the delinquent career. The author gives the results as follows: Up to October 15, 1926, 367 cases not then pending were reported to the department of mental diseases; 72 of these were not examined for various causes; almost half had been released on bail and could not be found; some had been discharged or noll prossed; sentence had been imposed by court before examination; a few refused to be questioned on advice of counsel. Two hundred ninety-five cases were examined—26 cases of major psychosis, *i. e.,* insane; 11 cases of psychopathic personality; 25 cases of mental deficiency or defective delinquency and 7 cases were recommended for observation in a mental hospital. Twenty-one per cent of the total were reported as having some abnormal condition. In 76 per cent no evidence of mental deviation from normal was noted. All but one of the 26 cases reported insane were committed to hospitals and observation there has confirmed the report. Only six of the 25 cases of defectives were committed, the rest being sentenced by Court. Those in the group of psychopathic personality could not be properly handled because of lack of provision for handling such cases. All were sentenced. The author concludes with a criticism of the law and states that in spite of its many defects it is far in advance of any other law for handling such cases.

EBAUGH.

EMERY, E. VAN NORMAN: *Revising Our Attitude Toward Sex.* (Mental Hygiene, 1927, Vol. XI, p. 324.)

Because of the discrepancies between parental attitudes toward sex and the correct biological viewpoint it is necessary that we revise our attitudes.

Parental attitudes are responsible for the attitudes of children and may be utilized for proper development of the sex impulse or may lead to disaster in the form of anti-social behavior of various sorts. Delinquencies or other socially unacceptable acts may grow out of the necessity for secrecy on the part of children in their efforts to understand this life problem. The older generation has been raised with an attitude of prudery—the younger generation is more frank and honest. We must train ourselves into a correct and tolerant attitude if we are to use these strivings of the young for their betterment. We cannot wait until the child asks questions about these matters as our attitude may frighten him away. We must be prepared to train him gradually, foresee his problems and take advantage of the turning points in life—adolescence, marriage, etc., to impart to them the knowledge necessary to them. It is entirely a problem of adjustment of the parents.

EBAUGH.

EBAUGH, FRANKLIN G., and LLOYD, RUTH: *The Rôle of a Mobile Clinic in the Educational Program of a State Psychopathic Hospital.* (Mental Hygiene, Vol. XI, 1927, p. 346.)

A state psychopathic hospital is a community organization that should attempt to be of service to all communities of the state in furthering early recognition and treatment of mental disorders and defects. The Colorado State Psychopathic Hospital uses the mobile clinic for material aid in the educational program. Actual contacts are made with communities from which patients are referred to the hospital, a better understanding of the social forces at work in each community is made possible, and more accurate recommendations can be given at the time of discharging patients. The mobile clinic, besides its function of examining a large number of persons, many of whom are later referred to the hospital for treatment, serves also as a means to educate the community as to the purposes and functions of the hospital and the principles of mental hygiene. The clinic should serve as nucleus for a follow-up system and for the organization of mental hygiene clinics in the larger communities of the state and should pave the way for a state society for mental hygiene. The authors present the method of organization of the mobile clinic in some detail and state that from May 18 to August 28, 1925, the clinics were conducted in 50 communities, 7,717 cases were referred to them of which 808 were given psychiatric examinations and 543 psychological examinations. Among the 808 there were found 165 normal, 305 reactive behavior disorders, 218 toxic and organic condition, 12 endocrine disorders, 97 mental deficiency cases and 11 psychiatric conditions. The expense of this work was minimal. The hospital census has risen from an average of 46 to an average of 70 during the time the mobile clinics have been in operation.

EBAUGH.

THOMPSON, C. MILDRED (Dean of Vassar College): *The Value of Mental Hygiene in the College.* (Mental Hygiene, 1927, Vol. XI, p. 225.)

The advance in mental hygiene in colleges and universities has come with such rapidity that it is no longer progressive to have an expert in mental hygiene on the staff, but it is reactionary not to do these things. The author outlines the ways in which mental hygiene has been useful at Vassar as fourfold: (1) Personal consultation and advice from the psychiatrist in dealing with the small number of serious mental disorders encountered; (2) as consultant and adviser in the many minor cases to prevent serious disturbances later; (3) mental hygiene as a regular course of study for freshmen to instruct them at the beginning of college life in the principles of mental health; (4) the expert to instruct the faculty in order to help them to be, not amateur psychiatrists, but intelligent teachers and wise officers. She takes her position as one who is not an expert in psychiatry but who has come into intimate contact with these problems. She cites instances to illustrate each of the ways in which mental hygiene has helped in the past and mentions the hope for greater expansion in this field in the future.

EBAUGH.

MEREDITH, FLORENCE: *Administration of Mental Hygiene in Colleges.* (Mental Hygiene, 1927, Vol. XI, p. 241.)

The problem of administering mental hygiene in colleges is not merely a matter of securing a psychiatrist, providing an office, arranging his office hours and making appointments with him for students who obviously need his help. The greater problem is finding those cases a psychiatrist can help. The author believes the college life peculiarly adapted to solving of life adjustment problems in that a group of people who are familiar with the life of the individual in many varied aspects can come together from time to time to discuss special problems. In this way minor defects noted by several, but not considered separately important, may, when brought together, lead to revealing deep conflicts. She states that because of the limited time of a psychiatrist, a weeding out process is necessary so that his efforts will be expended to accomplish the greatest amount of good. Much of this process can be accomplished as incidental to the established routine, *i. e.*, the medical examiner by adroit questions can sometimes locate cases otherwise passed over or reports on students may reveal them, especially if the faculty is trained to recognize behavior possibly symptomatic in nature. A summary of what she thinks mental hygiene administration involves she outlines as follows:

A. Personnel: Psychiatrist for full time work if possible. Medical Staff: One or more coöperating officials, an enlightened and coöperative faculty and a student body trained to seek suitable help.

B. Educational methods for benefit of medical staff, college official personnel and student body.

C. Definitely preventive measures: Favorable environment allowing for academic and social development. Favorable personal contacts with college officials. Lectures on mental hygiene. Consultations with medical staff.

D. Methods of discovering where special difficulties exist: Questions by physicians at physical examinations and at all consultations on physical health. Reports from officials. Reports from students.

E. Methods of treatment: By a psychiatrist as far as possible, by members of the medical staff under the supervision of the psychiatrist or by others than physicians in suitable cases when properly supervised.

EBAUGH.

BIRD, GRACE E.: *The Value of Mental Hygiene in the Secondary School.* (Mental Hygiene, Vol. XI, 1927, p. 253.)

Mental hygiene means more than a social adjustment that leads to social efficiency and individual happiness. It is an essential element in the learning process. The most conspicuous difficulties present themselves during the years of junior high school. The central problem of mental hygiene herein is adjustment of the pupil to the daily work and it minimizes one cause of mental conflict if curriculum and instruction are fitted to the pupils' needs and desires. She believes that one cause for the dropping out of pupils between the grades and high schools is lack of such provision. If the wide range of individual differences in interest and aptitude are considered every subject of the curriculum can be used as a foundation for proper mental adjustment. She states that one of the most perplexing problems is the relationship between pupil and teacher. Kindness and fairness on the part of the teacher are essentials that are often lacking from the point of view of the student. The fear of injustice is a severe handicap. This is especially seen in examinations. Also the personal relations between teacher and student in high school require especial attention because of the proximity of their ages. From the social standpoint the author believes this period of adolescence to be such a time of wild emotional upheaval that it is an ideal time for detection and prevention of the development of some of the neuroses. She thinks that opportunity should be given here for vocational selection by the students. The sex impulse can be utilized to cultivate the virtues of strength, bravery, chivalry, etc., and especially for æsthetic training. The emotions should be trained into the type of hopeful happiness.

EBAUGH.

TRUITT, RALPH P.: *Mental Hygiene and the Public Schools.* (Mental Hygiene, 1927, Vol. XI, p. 261.)

We are still hazy about the institution we are attempting to reform and the reforms we should like to make. In general, except in larger cities and more advanced communities, the schools lack social viewpoint. The system becomes mechanical, the teachers but mere cogs in the machine, grinding students through the educational mill. There are some exceptions of course, but the school fails in its duty if it fails to prepare the child to handle its

life problems and the three R's are incidental to this. He states that the mental hygiene problems begin in the kindergarten and poor reactions here may carry over into the years higher education. The aim should be to redirect at the start poorly directed children. The disturbing factors may be the teacher, the curriculum, the past training, the home, or poorly adjusted parents. These are reflected in the child in temper tantrums, day dreams, lack of concentration, nervousness, etc., and these symptoms should be recognized, traced to their sources and corrected. Stealing, lying, running away, sex delinquency, require careful research to determine causes. The school and home must coöperate. The fundamental aim is the adjustment of the child to himself and includes not only intellectual training but also the release of all his energies for proper adjustment in life. If this is accomplished in the earlier years the secondary schools would then primarily be concerned with mental hygiene problems arising from adolescent maladjustment. The greatest value of mental hygiene here is to furnish insight into these problems. The big problems are sex and vocational adaptation and provision for emotional outlet in dramatics, outdoor activities, etc. He thinks the school attitude should be influenced by the mental hygiene point of view so that the students will be studied individually as to total behavior and given insight into their problems. The students should be grouped as to their own needs rather than as to the needs of the system.

EBAUGH.

ANDERSON, ROSE G.: *The Problem of the Dull Normal Child.* (Mental Hygiene, 1927, Vol. XI, p. 272.)

It is not possible to consider the child as a miniature adult from the psychological side any more than it is from the physical side. The variation in mental ability among children of the same chronological age is well known and it is recognized that homogeneity in groups instructed together makes for efficiency. Ideally, there would be five groups, very superior, superior, average, inferior and very inferior. Various approaches have been attempted in isolated instances ranging from individualized instruction to special classes for the obviously mentally defective. So far little provision has been made for the superior group or the dull normal group and this adds difficulty in treatment of guidance problems in these cases. Children of the superior group are more easily adapted under the present system and the dull normal group is least capable of satisfactory disposition. Statistics of child guidance problem children and juvenile court delinquents supports the above—*i. e.*, the superior and inferior groups predominate in the child guidance problems and in the more serious offenses shown by juvenile court delinquencies the duller children are overwhelmingly predominant. The same is shown in statistics from penal and corrective institutions. The author states that this is not due to greater susceptibility of these groups but to lack of provision for their proper adjustment. The school is but one factor, but a correctable one, that aggravates the problems rather than diminishing them. The essential point she makes would seem to be that enough provision be made for

individual adaptation in the dull normal group so that the inhibiting effects of continued failure are removed by substituting activities in which the individual can succeed. Failure to do this is disastrous in that it develops poor work habits, unfavorable personality and anti-social traits at the same time that it fails to educate the child in the formal sense.

EBAUGH.

SIEMENS, HERMAN W.: *The Diagnosis of Identity in Twins.* (Journal of Heredity, 18: 5—201. May, 1927.)

The author emphasizes the importance of being able to accurately diagnose twins of one egg origin. Certain commonly accepted methods are rejected, such as the relations of the fetal membranes. It is felt the simplest, most accurate and most satisfactory method is by comparing "the totality of observed resemblances of one-egg twins with those of two-egg twins." A number of criteria are shown to be of value, the author going into detail about such data as the color of the hair and the color of the eyes. He points out, for example, that one-egg twins invariably have identical eye color, while in a study of 50 two-egg twins only three pairs had an equal degree of resemblance. It is felt that the more observations made of such traits the more accurate will be the diagnosis of the type of twins. Accordingly, the author has worked out a scheme for recording such traits which, in his opinion, will only allow error in less than one case in a million. He lists under fifteen different headings traits which are to be noted, starting with those which are invariably alike in one-egg twins and only rarely alike in two-egg twins, such as hair color, eye color and skin color, and ending up with traits which are only usually identical in one-egg twins, such as mental makeup, physical illnesses, etc.

The author also reports a case of unlike one-egg twins in which he was able to establish this fact by the use of his scheme. Because of a tuberculous spine in one twin there was a marked difference in the body build of the two which had led many observers to suppose that they were not single-egg twins.

KARL M. BOWMAN.

Book Reviews.

Reluctantly Told. By Jane Hillyer. Introduction by Joseph Collins, M. D. (*New York. The Macmillan Company, 1926.*)

This is a book which merits a wide circulation, not only among psychiatrists and physicians generally, but particularly among the lay public. It gives the experiences of a young woman who developed a psychosis and recovered after about four years in hospital. The book can best be compared with Clifford Beers' "The Mind That Found Itself." From the standpoint of a literary production, "Reluctantly Told" is greatly superior to "The Mind That Found Itself." On the other hand, this literary quality makes the book lack at times the atmosphere of realism which Beers has achieved in his book. The following sample illustrates this point:

"To make a bed—an endless task. The sheets were so big, they flapped like sails in an adverse wind; they slipped and grew bunchy under my hands. What funny piles they lay in. They did not look like sheets. What did they look like—nothing I had ever seen before, heaps of unearthly stuff, shapes from a nightmare. If they did stay still it would be better, but they moved. Each form was more disturbing than the last." One can scarcely imagine Beers writing such a passage.

To the psychiatrist the book affords a most interesting study of a recoverable psychosis of four years' duration. It also allows the psychiatrist to see himself and his hospital through the eyes of the patient. No psychiatrist can read the book without having a little better understanding of his patients, a little more sympathy with them and without having increased his knowledge of the treatment of mental disease.

Certain data are lacking which the psychiatrist would like to have for a full understanding of the case. Obviously the book could not give everything in detail and if it attempted to it might turn into an ordinary sort of case history. We have plenty of good case histories but few good books of this character. The merit of the book is not because of any careful, painstaking, detailed account of a mental sickness but in the glimpses it gives us of a sick mind and of its reactions. Various scenes are given us, showing the way things go on in our hospitals for mental disease. "It would be hours before it was time for sleep—for veronal. 'Maybe they will break their old rules; maybe I can have it earlier if I make a fuss;' they did, a little." What psychiatrist can fail to understand and appreciate that passage.

The well accepted principle of telling our patients the truth seem borne out by the patient's reaction to a lie. To avoid a scene and to prevent upsetting her, she was told she was going home when, in reality, she was being transferred to another hospital. "This had a most damaging effect

in two ways. It was months and months before I could be prevailed upon to trust anyone; often I broke into open revolt. Then too it widened the gulf between me and the outside world immeasurably, jammed me back into my own inner world of confused thoughts and questionings, weary hate and still wearier longings. I was broken, miserable enough, ill enough just then, so that had the barrier of distrust not existed, someone might have got a very strong hold upon me, strong enough perhaps to work even when I was quite unconscious of presence or personality. As it was I remained alone, not knowing where I had been taken, or with whom, inwardly questioning and listening, outwardly stony. I would have bitten off my tongue before I would have asked these people, who *lied,* for the simplest bit of information." If we accept this statement at its face value, it would demonstrate the absolute need of complete truthfulness to a patient. Perhaps some will wonder, whether this is partly the patient's estimate and that conditions would have gone along essentially unchanged had she been told the truth. It is too bad there is no way of definitely proving the matter, one way or another. However, our present view in psychiatry certainly supports this statement.

A number of points in the book bring up in a very clear manner the limitations of some of our modern psychotherapy. We now hold that if we put patients in decent surroundings they will tend to behave better. When one reads of the patient's rebellion to rough blankets, harsh soap, etc., there is a tendency perhaps to be critical of such treatment. Yet we find that during the earlier part of her psychosis she was wearing silken garments and had excellent bed linen but that she persisted in destroying these in spite of the attempts of the nurses to appeal to her better nature not to do so.

It is apparent that attempts were made to get her interested in occupational therapy and to get her to take walks. The patient's comment is interesting. "One reason I disliked going out was that 'it might do me good.'" Doubtless we are all constantly telling patients they should do this or that because it will help them get well but here we have a patient telling us that such treatment ony tends to make her refuse to do as requested.

We hear a great deal about the effect of music on mental patients. There have even been published articles which glibly assured us that music of a certain type will soothe patients and music of another type will excite them, etc. The limited outlook of such statements, the failure to understand the personal equation or the individual associations of a particular tune are not apparently understood by these writers. In this case, the patient who was an accomplished musician could not endure music of any type. Why? Because "music was too full of associations for me. I could not bear it."

Her account of a suicidal attempt in hospital leaves us a little puzzled. Apparently she took twenty-one and one-half grains of bichloride of mercury but was only sick for a short time. Here again, one feels that a true account of her condition is withheld in order to improve the style of the book. We are told "I was persistently and violently ill." Presumably this must mean

that she vomited up the bichloride and hence suffered no further effects since the dose taken was quite adequate to produce death.

As to the type of disorder from which the patient suffered, the book does not give sufficient data to allow one to express much opinion. As Dr. Collins, who has written the introduction to the book in his usual interesting and brilliant style, has had considerable contact with the patient and tells us that he considers her a case of manic depressive insanity of the mixed type, we accept his diagnosis. The hospital diagnosis was dementia præcox. From reading the book through we find reference to fever lasting for months various somatic complaints, four ulcerated teeth, etc. We may still feel dissatisfied as to the cause and type of her reaction. Treatment by veronal and restraint and no mention of hydrotherapy also suggest that more attention to the physicial side might have been desirable.

After reading the book, one is again impressed with the fact that mental disease is an individual reaction and that we really know very little concerning it. One is grateful to Miss Hillyer for adding to our small store of knowledge by her most excellent book. It cannot help but counteract some of the prejudices and misunderstandings with regard to mental disease and hospitals for the treatment of mental disease.

KARL M. BOWMAN,
Boston Psychopathic Hospital.

The Emotions, Morality and the Brain. By C. VON MONAKOW. Authorized translation by GERTRUDE BARNES, A. M., and SMITH ELY JELLIFFE, M. D., PH. D. Nervous and Mental Disease Monograph Series No. 39. (*Washington and New York: Nervous and Mental Disease Publishing Co., 1925.*)

This monograph constitutes one of the most interesting and most promising attempts towards a biological analysis of the world of emotions from its starting point in the monocellular organism up through the whole chain of progressive development until it reaches its ultimate perfection in what we call "Morality." But as always, von Monakow is not satisfied with analysis and criticism alone, however constructive the latter may be; his aim is synthesis.

His point of departure is the one quality that is proper to both soma and psyche: evoluted development. From this point he strikes out a path of his own, but always giving good and well considered reasons for the introduction and the use of new methods and new terms. After describing the generally accepted methods of psychological approach (giving due credit to Freud and other psychoanalists), their limitations and insufficiencies, he emphasizes the importance of a truly biological study of both the world of sensation and perception, and the instincts and emotions, starting in both instances with their first appearance in the evolutive scale and trying to detect their prime or primitive stage. After dealing quite profoundly with the problem of consciousness and the question of the existence of feelings comparable to human emotions in animals, the author puts forth his conception of the prime or basic forms of instincts. He distinguishes four

principal forms but states expressly that no sharp line can be drawn between them, that they merge into one another but contain *in nuce* all later active and latent feelings, affects and their derivatives onward and upward to the point of character: (A) Emotion or instinct engendered in connection with the search for food and other functions of prime importance in life, including the impulse of defense against injury in the broadest sense of the term. (B) Sexuality. (C) Elements of a trend towards the formation of collections of creatures of like nature ("herd-instinct"). (D) Seeds of affection towards creatures of other species, and eventually reverence for the universe. The evolution of the emotional life and of its carrier, the nervous system, is a parallel one. In the author's opinion, every healthy creature is born with a germinative impulse, an impelling force towards a definite degree of perfection (ennoblement), which finds its expression anatomically through the tendency of the function to attain localization in the head (*Wanderung der Function nach dem Kopfende*).

The structural and functional considerations which follow are without any doubt the most thorough and exhaustive compilation of our knowledge in this respect that has ever been done, and the same is true of a highly interesting table: "A tentative organization of the Emotions, Instincts and Morality." Both chapters contain some interesting definitions such as, "Morality is an egotism consecrated to the world interests of the future (altruism)."

The chapter on the anatomical structures and physiological functions is an admirable outline of the complicated and difficult relations between emotions and their morphological representation. Here the author deals with matters mostly studied and discovered by himself and given in his masterwork: *Die Lokalisation im Grosshirn.* But he does not confine himself in the present monograph to dry anatomical descriptions and enumerations of physiological data; life itself speaks to us, and the preponderant rôle of the glands and fluids as the dynamic forces and agents of our reactions is properly emphasized.

In the outstanding chapter of the book, "Pathology of the Emotions," the author outlines his theory of neurosis and quite extensively discusses Freud, whose conceptions are dealt with very fairly, several attempts being made to link at least some of them with organic correlates. For von Monakow regards it as unquestionable that the internal secretions or "an acutely altered blood composition" play a part in these disturbances, while at the same time the importance of psychological mechanisms is not disregarded. Dealing with both phobias and hysteria the dynamic factor in the disturbance is emphasized and linked with probable changes in the body fluids.

Dissolution and Resolution of Morality form the next chapter, wherein the whole scope of human relations and reactions, individual life as well as social, are discussed and linked with the conception previously outlined.

An English reviewer has referred to the present volume as "an unsatisfactory translation of an unsatisfactory book." Confessing that I began to read the work in English but was compelled to finish it in the original, I would modify this statement to the extent of calling it, rather, a poor

translation of an interesting and valuable, even if obstruse, contribution to the difficult problems with which it deals. Complex in both content and diction as this monograph is, the translators are not absolved thereby of the necessity for careful proofreading at the very least, such as would have obviated some dozens of such palpable errors as "special" for "spatial" (*örtlich*), the confusion of the preposition *von* with the title *von* (as in *Wagner von Jauregg*), etc., etc. We regret that the thought of such a master as von Monakow should have so frequently been distorted in its rendering into English; his genius deserves a *zweite sehr verbesserte Auflage.*

C. O. FIERTZ,
New York State Psychiatric Institute.

The Human Body. By LOGAN CLENDENING, M. D. (*New York and London: Alfred A. Knopf, 1927.*)

This is an original volume; fascinating in style and treatment of its subject matter. Intended primarily for the layman it fulfills its purpose so successfully that it will appeal to the professional man as well. The human body is surely no subject to be discussed lightly. Yet the author brings to anatomy, physiology and pathology a facility of expression, a modernity of epigram and a scintillating humor which enlivens the work beyond any yet published. Thus: "Surely everyone can recall one or two friends who have complained all their lives, and have lived all that time in the most perfect condition of health. They are inclined to have 'fashionable' diseases. In 1885 they had too much uric acid. In 1890 they had chronic appendicitis. In 1895 they took the Kneip water-cure. In 1900 they had floating kidneys. In 1905 they had tilted uteri. In 1910 they had colonic stasis. In 1915 they had all their teeth extracted. In 1920 they had non-surgical biliary drainage. In 1925 they had an inferiority complex." Or again: "And this same individual may even at the moment be taking treatments to prevent his approaching baldness, which beyond all peradventure is an hereditary condition. He may be sitting in chairs with snake oil and violet lamps playing over his head, when the only way to cure his baldness would have been to castrate his grandfather." The temptation to quote such tidbits is as great as the desire to reveal the identity of the villain in the mystery melodrama and should be equally resisted.

But do not get the notion that this is a book of wise-cracks. The author handles his subject effectively and with a certain originality as to its scope. The volume is divided into four major parts, entitled: I. The human body as a unit. II. The human body as an organism for the conversion of food and air into energy and into tissue. III. The human body as an organism for the reproduction of its own kind. IV. The human body and disease.

Psychiatrists would find Chapter 11, "The relations of mind to body," of particular interest. The author shows judgment worthy of a specialist in this field in evaluating major contributions. Speaking of Freud he says: "He made synthesis of the mind, and destroyed at one sweep those categorical conceptions of mental aberrations such as are embalmed in the old treatises, for instance of Ribot, 'Diseases of the Memory,' 'Diseases of the

Will,' and in the analytical codification of Kraepelin. These ancient conceptions had shackled and deadened both psychology and psychiatry."

The volume is a tribute to the publisher's art. It is beautifully printed on heavy paper; amply illustrated with clear diagrams, interesting cartoons and photographic reproductions. As in any work of such scope there are a few misstatements. One of these appears on page 175 where the gram equivalents of ounces is incorrectly given. Such minor matters can be easily corrected in well-deserved future editions.

"The Human Body" should serve as a model for the popularization of science. There are still those members of the medical profession who would jealously guard from the layman the knowledge they have acquired. Many physicians feel that a little knowledge is a dangerous thing; further, that the well-informed layman is a pest. Perhaps he is, but to the progressive physician the intelligent layman carries a challenge to keep abreast of the literature and to admit lack of knowledge when such is the case. Hiding behind the skirts of antiquated authority is little better than bluffing. The intelligent layman can also do much to further medical science through his moral and financial support of research and enlightened policies pertaining to the public health. Such a volume as "The Human Body," therefore, when circulated by physicians among their patients will render a mutual service.

NICHOLAS KOPELOFF,
New York State Psychiatric Institute.

The Psychology of Mental Disorders. By ABRAHAM MYERSON, M. D., (*New York: The Macmillan Company, 1927.*)

"Even amongst men and women who are cultured, who can speak with some degree of assurance about vitamins, tuberculosis . . . . there is only the vaguest knowledge of what constitutes mental disease. Either the subject is a source of shuddering humor, or else it is entirely neglected. . . . . This book flows out of experience . . . . the book represents an attempt to grasp the realities of mental disease. . . . . It is not a book of propaganda but a book which seems to stimulate intelligent, non-professional interest in a serious subject, and thus make it possible for society to grapple more resolutely with the problems of the mental diseases." Towards accomplishing this much to be commended purpose, Dr. Myerson's book goes far. Written for the *intelligent* layman, it deserves reading by medical students and internes.

"Mind is a function of the organisms, only artificially to be separated from its other functions. . . . . Psychiatry deals with a group of diverse conditions called *mental diseases,* and the term *insanity* represents a useless fusion of conditions not at all primarily alike in origin or course. . . . . Amongst the manifestations of life are those manifestations we call mental, and, broadly speaking, they rest on an organic basis, represent an interaction between the organic environment and that organic fragment we call the individual."

"Symptoms of the benign mental diseases. . . . . Theoretically, it is futile to divide the mind into compartments, since one cannot separate (for example) *remembering* from *judging*, or *feeling* from *conduct*. . . . . While it is recognized the mind shades off from what we call normal to what we call abnormal by insensible gradations, yet certain changes become prominent enough and isolated enough to be discussed as symptoms." Hallucinations and delusions are discussed broadly. "Mood alterations" include depression, fear and anxiety, exaltation, anger and excitement, and apathy—"a vegetation in mood, a paralysis of inner and outer interest, a saliva-drooling, glassy-eyed absorption in—nothing"! Alterations in Thought Processes and Personality Change complete this section.

Chapter III deals with "causes" of the major mental diseases, popular fallacies thereon, and alcohol and kindred drugs, syphilis, organic disease of the brain, and the question of heredity and environment. Not so much in this section as in Chapter VII, the author expresses healthy views on this dichotomy. He places the manic-depressive psychosis definitely as a familial disorder, but notes many striking discrepancies even here. "Dementia præcox (schizophrenia): Another mental disease of unknown cause, and also running in families, is much more sinister and even more unrelated to the experiences of life than manic-depressive psychosis." The reviewer, doubting this unrelatedness to the experience of life, rests with Dr. Myerson's statement: "In the obscurity which surrounds mental diseases, all look alike to the inexperienced, all look alike to the congenital generalizer. As our knowledge grows and light comes, insanity breaks up into units, each of which has a different cause and demands concentrated individual research." The use of the word asylum in the early part of the book carries its own connotation in regard to schizophrenia.

Chapter IV deals intelligently with the mild mental disorders. "Like greatness, some are born neurotic [?], some achieve neurosis, and some have neurosis thrust upon them." "Sex and its complexities runs like a scarlet web through the minor mental diseases, as it does through the whole of life. . . . . Everywhere there is a struggle for power, for having 'one's own way.' . . . ." There is a brief outline of general therapeutic considerations. (One should doubtless read *creditable* for credible, line 7, page 72.)

Chapter V deals with the contribution of Freud and others. Some of it is critical; none is bitter or absurd.

Chapter VI deals with crime. The author remarks with Sullivan (W. C.) "Crime, akin to alcoholism . . . . [is] in part constitutional, but in largest part social, whereas the bulk of psychiatric situations is constitutional in origin. Crime appears most conspicuously in adolescence and early manhood, but this is not the case with mental diseases. . . . . Crime varies with social relations, with economic stresses and crises, with wars and pestilence, and mental diseases do not show any such variations." These distinctions impress the reviewer as more apparent than real. They are a "statistical" affair, where the individuality of the units is erroneously submerged in numbers. Social psychology is not always owned by psychologists as a branch of their science. The social phases of psychiatry are here disowned

by Myerson. He does better elsewhere, as already indicated. This chapter has a good discussion of psychiatry and the law, and shares with the final chapter on mental hygiene a valuable commentary on the unwisdom of foisting psychiatry on the social sciences as cure-all. "A program of mental hygiene is an ambitious, if not presumptuous, undertaking at a time when psychologists are divided up into more or less hostile camps, and when psychiatrists have not by any means solved the underlying causes of many of the mental diseases. The riddle of personality and the growth of character still await great scientific discoveries, and the revolt against conventions which prevails with its Mencken's versus its Babbitt's, shows that we are not even anywhere near united in what we want of the human being." Good sense characterizes Myerson's suggestions under the heading of prevention: he demonstrates his acceptance of the ontogenetic view as to the origin of much maladjustment. A worth-while book.

HARRY STACK SULLIVAN,
Sheppard and Enoch Pratt Hospital.

The Invert and His Social Adjustment. By "ANOMALY." Introduction by ROBERT H. THOULESS, M. A., Ph. D., Lecturer in Psychology at the University of Glasgow. (*London: Bailliere, Tindall & Cox, 1927.*)

The anonymous author, concerned at "The existence of a dangerous half-knowledge of homosexuality, which half-knowledge degrades public opinion and obscures the real social problem," attempts a book "of more particular use to those who find themselves at a loss to provide practical advise for patients or penitents of confused sex." He succeeds remarkably, considering his obvious lack of psychopathological knowledge. The book is distinguished by relative freedom from that apology and special pleading which renders so many well-intended books by inverts, inutile and misguiding. It is to be recommended to medical men, generally. While some statements and expressions of the author's opinion are not consonant with what seems to be the best of current psychopathological information on inversion and diversion of the sexual impulses, he can scarcely be criticized for this, nor does his book deserve any the less wide reading.

Concerning the magnitude and confusion of the problem of inversion, he writes: "One doctor tells you that he frequently encounters cases of homosexuality in his practice; his neighbor—an eminent neurologist—assures you that he has only come across one or two in the whole course of his experience. One good priest asks if inversion is 'one of those venereal diseases,' while another discusses it frankly, and takes down his books on moral theology to show you where the subject is treated fairly and specifically. . . . . In certain intellectual circles—not by any means invert—the influence of homosexuality on art, literature and even history, whether admitted or disputed, is, at any rate freely discussed. In other circles, people apparently equally intelligent and intellectual are actually, or designedly, blind and deaf to identically the same evidence, and when it is brought to their attention avert their gaze and pinch their nostrils. . . . . Coming to more scientific knowledge of the subject, a similar confusion is to be seen. . . . ."

"A homosexual person (or invert) is one who, though apparently sexually normal, is entirely unsusceptible to the sexual and emotional attraction of the opposite sex, but is susceptible to the sexual and emotional attraction of his, or her, own sex. . . . . Men whose emotional susceptibilities respond to women as well as to men are not classed as inverts. Such men are referred to as being 'bisexual,' and I count it of primary importance to the study of the problem of inversion that it should not be confused with the problem of bisexuality." Elsewhere, the author remarks: "All told, the existence of bisexuality is responsible for much of the 'pussyfooting' which hinders a fair study of complete inversion. I have encountered a most surprising disposition on the part of bisexual, as well as of perfectly normal, people to deny and even positively to resent the suggestion that a definite distinction can be made between complete inverts and bisexuals. . . . . I therefore definitely sought out many inverts, and several experienced advisers, and asked them if they found any difficulty in drawing a line between one condition and the other, or knew of cases where complete inversion was merely a state of transition to, or from, bisexuality. In every case my opinion, that a definite distinction can be made, was endorsed. I can therefore do no less than recommend advisers to accept the fact of complete inversion where no heterosexual attraction exists or has existed."

One of the author's premises is: That the invert's condition is either congenital, or dates from the dawn of sex consciousness. Of himself, he remarks, "Since the beginning of my sex consciousness women have held no attraction for me, while the appeal of males has been constant. . . . . This inversion . . . . has existed without intermission for as long as I can remember anything. It is not necessary to follow the course of my sexual development or experience, but it is important to note that it was not until after I was 24 years of age that I began very slowly to learn from one obscure source or another—more often than not polluted—the current theories of homosexuality. During most of those 24 years I had risked my soul, body and *liberty* in a game of blind-man's buff with the most vital instinct of mankind. . . . . It is because the advise I received at a time when my morale was almost at ebb changed my whole outlook on life, that I feel it worth while to attempt the enlightenment of those likely to come across inverts in a similar condition."

The chapter on Causes and Cures includes remarks on the alleged causal relation of "the 'mother fixation' complex" and of the "Œdipus complex." "I would suggest that on the face of it it seems simpler and more natural to see the invert's peculiarly strong and intimate affection for his mother as an effect, not a cause, of his condition. In the normal man's life . . . . 'A son's a son till he gets a wife.' . . . but it is when he reaches the age when his mother might well . . . . feel a certain jealousy of 'girls' that the invert begins to display those signs of inordinate attachment with which he is so frequently reproached." "Many writers suggest that . . . . if a boy's sexual appetites are first stimulated by a male, he will become 'perverted.' If this were the case surely half mankind would suffer perversion. . . . ."

It is difficult for the psychopathologist to secure data which insures him from distortions of view arising in preoccupation with exclusively pathological material. It is easy, however, to discount Anomaly's criticism of the 'incest' notion, and to find many cases which contradict his statement as to the late appearance of "signs of inordinate attachment" to the mother. Even more in point, however, are our observations of "inordinate attachment" of the mother to the son, with, as a sequel, inversion in the latter. This is especially the case in unhappy marriages—spiteful or otherwise—where the son is required to satisfy the ungratified love-hunger of the mother, and in case of embittered divorcees. We need not quarrel with anyone's criticism of our terms, "mother fixation," "incest fear," "Œdipus complex," etc.; it is quite likely that we will do much better formulating when we become more scientific in our attitude to data. The refutation of the doctrine of "first experience," has been confirmed by a study made by the reviewer: in the community studied, an astonishing proportion of the boys had engaged habitually in overt homosexual relations. Only a small number failed of heterosexual adjustment of an average type. Those who failed and continued more or less perverted homosexuals seemed in the few cases available for study, to have ample determiners for that course, in the shape of inter-family factors, and the like.

That there is any such distinction as that our author urges, to be made between complete inversion and bisexuality does not seem to be at all supported by psychopathological data available to the reviewer. Either we have been woefully misguided by our theory, or the *completely* heterosexual and the completely homosexual individual is an abstract construct which we erect in our speculation, as limits between which, in infinite gradations, actual individuals are to be classified. Just as his theories of causation are erroneous from inevitable scotomata, as well as in method (not causation but evolution is the principle in biological and psychopathological hypothesis formation), so his deductions as to the distinction between invert and bisexual suffer from the same factors. Regardless of these considerations, however, his position has good justification in so far as it ensues in discretion in advice: as he emphasizes, to one who cannot recall any instance of attraction towards a member of the opposite sex, advise of marriage is stupid indeed, and the following of it, heading for sad wreckage.

After criticizing the ignorant assumption that inverts as a class are abnormally lustful people of more or less insatiable and uncontrollable impulses, whose lust, either as a result of satiety or for some other extraordinary and sinister reason, is directed towards persons of his own sex, he remarks that such an one "may or may not be lustful, but he cannot help being human, and to be human implies at least some small measure of need of human relationships and responsiveness to the personalities of others. . . . . Thus his problem is not the mere suppression of lust, but the far more difficult problem of suppression, diversion, or control of his whole emotional nature. . . . . It is interesting to note that when those who have been ignorant of the existence of inversion learn of its frequency [placed by the author as five per hundred of the male population, with

no estimate as to the additional number of the bisexual], they suddenly find themselves in possession of the key to many puzzles in the lives and actions of their friends which had long baffled them."

Some of us who have worked with "incompletely" inverted patients may be distressed to read our author's opinion as to cure: "Personally despite much inquiry I have never encountered a cured case, nor heard of any reliable source of treatment, nor even of any recognized expert on the subject. Presumably if there were any appreciable fire a little smoke would have arisen." From his definition of the true invert, one would assume that "cure" for him represents a change such that the patient becomes entirely unsusceptible to the sexual and emotional attraction of his own sex, but becomes *de novo* susceptible to the sexual and emotional attraction of the opposite sex. Since the reviewer has so far failed to discover evidence to the effect that anyone is *entirely* unsusceptible to the sexual and emotional attraction of his own sex, and has yet to encounter anyone *entirely* unsusceptible to the sexual and emotional attraction of the opposite sex (regarding *hate* as in both cases a defensive formation against dangerous love), he is estopped from any simple refutation of our author. When, for example, he writes: "Not only do most men want women, but they resent the implication that anything else might appeal to them, and they frequently show their resentment by the physical violence with which they repudiate such suggestions," the psychopathologist cannot take so näive an interpretation as a reflection of the true state of affairs. Not because he is himself perverse, or a "pussyfooter," but because of his experience in dealing with conscious and rationalistic processes as resultants of relatively extra-conscious processes, he is apt to analyze *resentment* into more simple factors. Again, "Occasionally, when semi-intoxicated and away from women, some men will disclose apparent symptoms of inversion. This is seldom a case of *in vino veritas;* probably it is nothing but maudlin sentiment, or, at worst, a drunken application of the rule, 'Any port in a storm.'" I wonder how often other psychopathologists have encountered a history of this very behavior preceding by months or years the eruption into consciousness of frank homosexual material and the initiation of a psychotic or subpsychotic conflict. We do not agree with the implications of Anomaly's last-quoted statements. We feel that alcoholic intoxication is a rather infallable path to (the imperfect expression of) various dispositions, tendencies, and sentiment-formations ordinarily vigorously suppressed and repressed by the ideals.

Cure, if it is possessed of meaning, must refer to adjustment of the individual to and in his situation. A psychopathologist would hesitate to attempt the "cure" of a satisfactory adjustment. (And recall that the individual situation determines *in itself* the satisfactory or unsatisfactory nature of its configuration.) Holding no mandate of theological or other transcendental authority, it is not for the physician to say that one satisfactory adjustment is to be preferred in a particular individual to another. One cannot but recall Mark Twain's "The Mysterious Stranger." We generally learn to leave well enough alone. In fact, even if we are young and enthusiastic and much in the grips of our own unanalyzed ideals, we come

soon to realize that the only force at our disposal for use in the reorganization of personality is that provided by the real desire of the individual for an alteration in himself. Anomaly writes: "I believe sexual inversion to be a misfortune offset by few, but certain, advantages. I do not glory in the condition, and constantly endeavor to conceal it. Were a reasonably certain cure available I would take it, even though the risks involved were equal to those of a major operation." I wonder. The scotomata reflected in this book make one wonder. The dubious cooperation of relatively comfortable inverts under treatment (at relatives' behest, etc.) makes one wonder. At least, we can agree with Anomaly that "cure" in his or any other simple sense ceases to be reasonably probable as the sufferer goes through the third decade of life.

There are chapters on Symptoms—this reaching back into childhood—on Partial Inversion—the poorest in the book—and on False Deductions. In the last mentioned, the author emphasizes the "sanity" of most inverts. He remarks: "There is almost an exact parallel between the psychological and physiological life and development of the normal man and that of the invert." No doubt can be entertained that adjustments are achieved by inverts; no data can be presented as to the relative frequency of such adjustment as compared with heterosexual folk, but we would not demand a huge percentage of them, to be equal. Other popular fallacies are laid at rest in this chapter.

Chapter VIII deals with Morals and Ethics. Much of this matter is from the standpoint of a Roman Catholic, the faith of the author. While there are points at which his discussion may be without value to Protestant communicants, there is much good sense throughout the chapter. It is his conviction that continence is both entirely possible and quite harmless. He stresses the evil affects of excess, warns against perverted behavior, and councils' concealment of the condition of inversion from even the most intimate friends.

Chapter IX, "Women, Marriage, Romance," is particularly good. "In the whole series of parallels between the invert and the normal man there is none more striking, nor more pitiful, than the invert's attempt to find peace and satisfaction in the achievement of a permanent union with some similarly conditioned man. . . . . Excepting the indiscretions which sustain blackmailers, there is nothing so fraught with danger and unhappiness for the invert as romantic attachments. . . . ."

Chapter X deals with Sublimation: "Happiness is founded upon the practice of unselfishness; if this is true in its application to the normal, it is doubly true as applied to inverts. . . . ." The matter is good: "Had I been writing this at 25 instead of at 40, I should have suggested a line of action which I now know to be more romantic than effective. . . . . I only wish I could truthfully declare that the love of inverts is capable of some form of heavenly distillation, whereby it should emerge as a pure spirit clothed only in romance, but I regret to say that it is exactly parallel with normal love, and is no more susceptible to sublimation into an absolutely non-physical emotion than the love of a man for a woman. By this I do

not mean that all love finds or even seeks physical expression, but that if it is tended and cultivated it is bound to blossom forth."

This is a timely book. It is to be regretted that competent contributions to the literature of sexual inversion are so few that we must welcome this scientifically deficient work. It is a serious reflection on medical men, and particularly on psychiatrists, that Anomaly continues unilluminated on many helpful aspects of his subject. He has encountered psychoanalytic statements, but they have not impressed him. That is not by any means solely his fault. Psychoanalysts have had to over-emphasize because of opposition. Psychopathologists, have "accepted or rejected," have not gone deeply into the nature of their alleged explanatory conceptions. Without discussing the present status of the psychology and psychopathology of sex—towards the elucidation of which at least one body of research is progressing—one cannot but condemn the current tendency to glibly interpret many sorts of behavior and thought as arising from "concealed" or "disguised," or "unconscious" homosexuality, and from "the homosexual component" of libido. Some of us recognize a homosexual phase in the evolution of personality. We know that some men rest there, that some grow past it in the fashion of bisexuality, and that some return to it from heterosexual rebuffs or for other reasons. The cogent "why," the exact experiential factors and others which determine these complete or partial failures in the achievement of heterosexual adjustive ability, these are now only but beginning to come to light; they are matters of indifference to all too many of us.

Yet the close study of mental disorders, mild or severe, is always bringing to us material, formulated or readily formulable in terms of homosexuality. The appearance of a blind, quite unwitting outreaching for agreeable relationship to some member of his own sex is so frequent a preliminary to grave maladjustments as to be sought in every schizophrenic. The appearance of this factor in the genesis of alcoholism is amazingly uniform. The reaction formations, defenses and barriers interposed to awareness of homoerotic impulses—real or supposed—provide a great body of psychopathological phenomena. They form a first approximation to the understanding of a great number of psychopathic personalities. The dynamisms of these imperfect sexual evolutions are of great importance to our science, an importance exceeding considerably all the other aspects of inversion.

And the social ramifications of inversion are wide, and the handling of these problems by physicians, clergymen, and the social machinery—law, etc.—are medieval. It is to be hoped that the appearance of this anonymous book will mark a new phase in medical and psychiatric attention to sexual evolution and maladjustment.

HARRY STACK SULLIVAN,
Sheppard and Enoch Pratt Hospital.

In Memoriam.

DR. THOMAS W. SALMON.*

The history of events is the history of men. The great body of men in any group—political, military, social; or be it profession such as medicine, law, theology, education—contribute not a great deal to events. No professional group can rise much above the median of the general population; its intelligence, its culture, its emotional hindrances cannot be much above the general group from which it comes and in which it lives. Many must be dull, many must be routinists and timeservers, carrying on by rote what they have learned from their preceptors. There can be few—for any given time there are few in any general population—who have qualities so combined as to make it possible for them to change the current of events in any large way. This does not mean that they are unimportant. The integrity of a group or profession is dependent upon them, and the social value of the group is to be measured not by the occasional "biological sport," if you will, who is not representative of the whole, but by the average of the units composing the group. Each contributes his part in the maintenance of the group or profession, and the group as a whole may change mightily the course of social events, although the group moves across time as a sluggish river. However, events or change of current within the group, or even events or change of current in the relation of the group to contiguous territory or other groups, are made by men, in any given instance by a man, one who in his personality and character possesses a combination of qualities which we always recognize as rare. In the field of science those who have changed events have had intelligence and imagination—Virchow, Pasteur, Wassermann, Kraepelin, Freud, Starling, Darwin, Einstein, Millikan. Many men have intelligence, but not a few are

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unable to use the rare intelligence they have because of emotional handicaps. Many with intelligence lack imagination; many have imagination so unbridled as to be a pitfall; only a few in any given generation have intelligence and imagination combined in such a way as to cause them to stand out as more effective than their fellows. Through them events take place, history is changed, and man continues his conquest of the world and his own development.

In those fields which combine science with living, which, if you will, relate science to life, represented by several professional groups, but by none more importantly, perhaps, than medicine, a still rarer combination of qualities is necessary—intelligence, imagination, and fine feeling. It is the latter that is the stumblingblock. A hair may disturb the delicate balance when one is to weigh the quality which we can only name as fine feeling, sensitiveness, or a certain sensitiveness to living. A hair's weight too much, too little—the danger is greatest perhaps that it will be too much and change sentiment into sentimentality—and the combination is lost for greatest effectiveness. When occasionally this combination appears in an individual, that individual influences events that ten thousand men without this special combination of qualities cannot change.

I do not believe that under the circumstances of my writing I stress these qualities because Salmon possessed them; I believe I have been objective in arriving at them only to find that he had them. But whether or no, they were the qualities that are in evidence throughout all his work—in private practice, in the state hospital, in the Public Health Service, in the manifold activities of The National Committee for Mental Hygiene, in the psychiatric work of the Army, in the work of the Veterans' Bureau, in the planning of the new psychiatric center at Columbia University—qualities which made his work so strikingly effective, and made it possible to influence the course of events in American medicine, in the field of psychiatry and in contiguous social fields. They were the qualities, too, which tied men to him in a fine and close personal relationship.

Dr. Salmon, on receiving his diploma from the Albany Medical College in 1899, began his work as a private practitioner at Brewster, New York. Ill health developed and it was necessary for him

to spend some time in the Adirondacks recuperating. Following his return to health, he entered the New York State Hospital Service as an assistant physician at the Willard State Hospital. This turned out to be an important step in his life, not only in that it gave him his first contact with psychiatric problems, which later came to be his main interest, but that it brought him in touch with Dr. William L. Russell, who, at that time was also a member of the staff of the Willard State Hospital. A friendship and professional relationship developed, which continued throughout Dr. Salmon's life, and influenced in many ways his subsequent career. It is not generally known, perhaps, that during his period at the Willard State Hospital, Dr. Salmon studied a diphtheria epidemic that developed there and published two papers in regard to it. Probably because of his experiences in this epidemic, he seems to have become more interested for the moment in epidemiology than in psychiatry; and in 1903 he entered the United States Public Health Service. Here, however, he found other problems than those of epidemiology to challenge him—the neglect of deep sea fishermen, for whom he advocated a hospital ship, which was eventually obtained; the problem of proper, even human care of insane immigrants held for deportation; the devising of methods for psychiatric examination of immigrants, and the like. Dr. Salmon contributed to other departments in the United States Public Health Service, but his chief service, perhaps, was in relation to the immigration service, to which he was assigned in 1905, and in this service to the examination and care of the insane. The time may not yet have come for writing the full history of the events of those days, and it is probably enough to say now that at that time, as a young man, he showed the same fearlessness and quiet courage, persistence and resourcefulness in the face of what would seem to be almost insurmountable obstacles that he showed later as a mature man in meeting his part of the problems of a world crisis. Although he did not come off in this contest with indifference, bureaucracy and red tape the complete victor, he accomplished much, and his accomplishments were the beginning of the development of an adequate psychiatric service for immigrants at Ellis Island. This has meant much, both in the protection of immigrants, and in the protection of the country against the entrance of immigrants who, because of their mental condition, would become dependent upon the charities of various

states. So serious had this situation become—the dependence of insane immigrants upon public charities—that the state of New York, probably the greatest sufferer, appointed a board of alienists to study the matter and in 1911, Dr. Salmon obtained leave of absence from the United States Public Health Service to become the chief medical examiner of this New York State Board. From his work with this Board developed important protective legislation.

In 1909 there had been formed in New York, through the effort of Mr. Clifford W. Beers, and the assistance of such men as Professor William James, Dr. Adolf Meyer, Dr. August Hoch, Dr. William Mabon, and Dr. William L. Russell, an organization known as The National Committee for Mental Hygiene. This Committee had as its plan the improvement of the care of the insane throughout the country. When the plans had been sufficiently matured to warrant the employment of a younger man to undertake certain studies for the Committee, a fund for the purpose having been obtained, the Committee turned to Dr. Salmon, who in the years just previous, in his work in the immigration service and with the New York State Board of Alienists, had shown the qualities of intelligence and courageous leadership that the work demanded, and in 1912, with leave of absence from the United States Public Health Service, Dr. Salmon undertook for The National Committee for Mental Hygiene a special study of hospitals caring for patients with mental disease. He continued on leave from the United States Public Health Service until 1915, when, adequate funds having been obtained for the work of the Committee, he resigned from the United States Public Health Service and became the first Medical Director of The National Committee for Mental Hygiene. He remained as Medical Director of the Committee until January 1, 1922, when he resigned to enter private practice, having been appointed in 1921 Professor of Psychiatry at Columbia University.

When one contemplates his accomplishments, it does not seem possible that in this period of ten years, 1912-1922, only five were devoted to laying foundations for the work of the National Committee, the other five having been devoted largely to war work of one kind or another. To be sure, the work during the war grew out of the work he had been doing and the foundations he had laid during the years 1912-1917, and the success of the work during the war

reacted favorably in the subsequent development of the work he had previously planned. But it is not so much to the result I refer as to the amount of planning and getting under way that was accomplished during those five years, 1912-1917. There was nothing spectacular about that work. It did not attract great public attention as so many public health movements have done in their beginning. It was solid, intelligent work that could have been planned only by one who sensed the significance of what he was doing, who saw clearly and looked well to the future. A library was established—not just a library, but a very special library. Not a collection of books that duplicated the shelves of almost any good public or medical library, but a library, carefully indexed, that held comparatively few books, but was rich in current reprints and extract material that had not been collected elsewhere. A Department of Hospital Service was organized to gather information in regard to the hospitals for mental disease in the country and to create a library of hospital plans, particularly of new construction. A list of the public and private hospitals of the country was prepared; also a directory of the practicing psychiatrists and neurologists in each state and city, including an outline of their training. Methods were devised and forms prepared for the survey of state hospital systems and the general system by which states cared for their insane. At the request of governors, legislatures, and official boards, surveys were undertaken. Surveys in over 30 states have been made by the National Committee, most of these under Dr. Salmon's direction. In each survey recommendations were made looking toward the improvement of the care given to the insane, and in a more than gratifying number of instances these recommendations were carried out, or in large part carried out. A Department on Mental Deficiency was organized and a program devised for the identification, education and training, and when necessary, proper segregation of the feebleminded. The laws in the various states pertaining to the insane and the feebleminded were compiled and published and an organization was created for collecting currently all new legislation upon these subjects. A Department of Uniform Statistics was created, and through the coöperation of the American Psychiatric Association, a uniform nomenclature and a uniform method of statistical recording were adopted by hospitals

for mental diseases throughout the country. For the purpose of studying the relation of mental disease and defect to delinquency, psychiatric clinics were established at Sing Sing Prison and the Juvenile Court of New York City and a psychiatric bureau at New York City police headquarters. This was not the first work that had been done in this field, previous work having been done in Chicago by Healy and in Massachusetts by Stearns; but the work at Sing Sing was the first large study of its kind ever undertaken and from it has come much of the impetus that has carried forward similar studies since. In order that the layman might come to have a more intelligent and therefore more sympathetic understanding of the problems in the field of psychiatry, the quarterly journal, *Mental Hygiene*, was established.

These, of course, are not all of the activities that Dr. Salmon undertook as Medical Director of the National Committee, but they are sufficient to indicate the intellectual grasp he had of the problem he had before him and the large way he therefore went about organizing this new undertaking. As has been said, none of these things was spectacular, or designed to attract general public attention; each had importance in itself, but each was an integral unit in a whole; none gave large immediate returns, but each, as well as the whole, held potentialities for growth with increasing and sure effectiveness. Not many public movements are planned in this way. Other methods are usually preferred by young directors of new movements. Dr. Salmon's judgment in this matter was sound.

Two other major activities, probably the most important of his career, remain to be mentioned—his work during the war and the inception and carrying through of the plans for a psychiatric institute in connection with the new medical center at Columbia University. These, however, are so well known as to need here only briefly to be stated.

When one thinks of the general indifference to all psychiatric problems in 1917, it is little short of amazing what Dr. Salmon was able to accomplish. Not only was the general public uninformed, it was mostly misinformed in regard to the nature of war neuroses; the medical profession, largely as uninformed and misinformed as the lay public, held psychiatry in almost complete disregard—psychiatry was the Cinderella of medicine, as Dr. Salmon

once phrased it—army officers were reared in a philosophy as alien as could be to the philosophy of conduct upon which the psychiatrist's work is based. What opportunity could there be for any work, let alone proper work, under such circumstances?

As is well known, Dr. Salmon was the Chief Consultant in Psychiatry in the American Expeditionary Force and for his services was awarded a distinguished service medal and was promoted to the rank of Brigadier General in the Medical Officers' Reserve Corps. One can well believe that he was properly proud of these things, but one knows full well what this war service meant to Salmon—that more than 80,000 deemed unfit were not needlessly and dangerously exposed to war; that thousands of young men, for whom exposure was too great, to-day owe their health and effectiveness to timely treatment; that many hundreds, officers and men, found available the assistance they needed at a critical moment to make their war service effective; that thousands who unfortunately are not now and have not been since their service in good health have been well cared for from the day they became ill; that the services of a well-trained psychiatrist are no longer disregarded, but are sought to an extent that for the moment is embarrassing because of the comparatively small number available; that psychiatric data and the psychiatric point of view have permeated not only an army, but a social structure and are producing a reconstruction in social thinking. This, one feels sure, is what the war service meant to Dr. Salmon.

The new psychiatric institute, an integral part of the new medical center at Columbia University, will now stand as the culmination of Dr. Salmon's work. Such a center had long been in his mind, a center in which the ablest men could work advantageously, where the highest standards of therapy could be maintained—one puts this first, for it was the patient that Salmon always had first in mind—clinical and laboratory research carried on, and personnel trained; and a center in proper mutual relationship to other medical specialties and laboratory sciences. Due in large part to his efforts, such a center is now in process of building, and psychiatry and medicine may look forward to an opportunity they have not had before and the sick of the community to an increasing understanding of their difficulties and increasing ability to assist them.

Dr. Salmon would be the first to decline the credit for the success of these two undertakings, pointing to others who had a part in each. But those who had a part in either or both would be the first to say that it was Dr. Salmon's vision, inspiration, intelligent planning, and resourcefulness that made success possible. Many have had important work to do in each, but there is no question to whom credit belongs.

Dr. Salmon influenced the course of medicine and psychiatry in America. The qualities that made it possible for him to do this are, I believe, the qualities I named in the beginning—intelligence, imagination, and fine feeling, or a certain sensitiveness to life. He was an idealist, but he was not a visionary. He was a practical idealist, not in the sense that he would sell his ideals for a mess of pottage, for a cheap and temporary accomplishment, but because his ideals were practicable, frequently more practicable (economical and sensible)—as no one could demonstrate so well as he—than the unideal, so-called practicable, economical, business-like, and common-sense plans proposed in opposition to his. This type of idealist the world cannot well do without.

Dr. Salmon was drowned in August while sailing on Long Island Sound. There survive him his work, his wife, six sons and daughters, and men and women both within and without the medical profession who admired him, who were his friends and who followed confidently his leadership in mental hygiene and psychiatry. He gave much and generously to them all and they can only hope that he found in these associations, in his work and in life those things he needed to make living valuable to him.

FRANKWOOD E. WILLIAMS.

The National Committee for Mental Hygiene.

VITA.

Thomas William Salmon, born, Lansingburg, New York, January 6, 1876; son of Thomas H. (M. D.) and Annie E. (Frost) S.; M. D., Albany Medical College, 1899; married Helen Potter Ashley of Lansingburg, December 21, 1899; private practice and Willard (N. Y.) State Hospital 1899-1903; commanding assistant surgeon U. S. Marine Hospital Service (now U. S. Public Health Service) October 29, 1903; passed assistant surgeon, 1908, resigned January

1, 1915; Chairman, New York State Board of Alienists, 1911; Director of Special Studies, The National Committee for Mental Hygiene, 1912-1914; Medical Director, The National Committee for Mental Hygiene, 1912-21; staff, Rockefeller Foundation, 1915-21; Professor of Psychiatry, Columbia University, 1921-27; consulting psychiatrist, Presbyterian Hospital, 1922-27; Major, Lieutenant Colonel and Colonel, M. C., U. S. A., 1917-19; Brigadier General, M. R. C.; senior consultant in neuropsychiatry, A. E. F.; awarded Distinguished Service Medal; Editor, Neuropsychiatric Volume, A. E. F. Section, (History) The Medical Department of the United States Army in the World War; Member, Permanent Inter-Allied Commission for the After-Care of Disabled Soldiers; member, International Jury of Award, Panama Pacific International Exposition; awarded Presentation Medal, National Institute of Social Sciences. Member, American Medical Association, American Institute of Criminal Law and Criminology, American Association for the Advancement of Science, New York Psychiatric Association (president), American Neurological Association, American Psychiatric Association (president), Association of Military Surgeons in the United States, Phi Sigma Kappa. Clubs: Century; Larchmont Yacht; Army and Navy (Washington, D. C.). Author of chapter on "Immigration," in Modern Treatment of Mental and Nervous Diseases, 1913; chapter on "Mental Hygiene," American Year Book, 1917-20, and in Preventive Medicine and Hygiene, 1916-20, etc. Contributor on psychiatry and mental hygiene to magazines and scientific journals.